COAL AGE

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MOST of us have one viewpoint for mechanical installations and an entirely different one for human equipment. And nowhere is this fault more emphasized than in the individual himself.

A man receives $1500 a year. Viewed in the light of reason, that means but one thing: He has been able to capitalize his ability for $30,000, since $1500 is the annual income at 5 per cent. on that sum.

Now, $30,000 will buy quite a few mine motors, and any one of these machines will pull a much greater load than a two-legged human, but unlike the latter, the locomotives can't think, and are absolutely useless when not directed by intelligent thought.

It's right here the individual has it on the machine. The latter is a known quantity and the company will never get from it any more than a fixed maximum horsepower. The energy of a human varies within a wide range, and the capital value a company places on a man depends largely on the amount of sensible efficient effort he develops.

If we expect the corporation we work for to increase the capitalized value placed on us, it is essential that we treat with care the body on which our mind depends for strength and sanity.

A man can become of greater value to a company as time passes; a mine motor will never be worth a dollar more than it was on the day of its purchase. The whole matter is a purely business proposition. Capitalized ability is more to be desired than capitalized property. The income from honest effort generally creates happiness. The annuities from massed wealth not only breed idleness and discontent, but in the hands of incompetents and degenerates, are most potent of all causes of class hatred.

In one way, however, the motor and the man correspond; each must possess the faculty for staying on the rails. An employee who frequently jumps the track, landing oftentimes in saloons and dives, won't be capitalized at any huge sum.

The fellow who proposes to increase his valuation to $100,000 or $200,000, must think fast and travel straight. He must study, read, observe and labor not a minimum eight, but a maximum 12 or 15 hours a day.

The age for whittling sticks and swapping stories at the corner grocery passed with the kerosene lamp and the stage coach. Sound sense and sold virtue have been essential in all ages; it's the application of ideas that has changed. We might have all the reputed courage of the ancient Romans, but our army would be useless if equipped with bows and arrows.

Also, the man who slows up and complains that nobody is watching his earnest effort, is in a class with the fellow who believes luck carves all careers. Someone higher up is sure to set a real value on our work, and 5 per cent. interest on a true capitalization, based on quantity and quality of results produced, will eventually be paid us.

And speaking of luck, let us realize that such an element doesn't enter into a man's life when measured over a period of years. For a day, a month or a year, maybe Yes, but for a score of years, No.

More good men have been hopelessly ruined by once making a little easy money than were ever incapacitated by inherited inability. Things go not by luck, but law. Winds and waves are on the side of the best navigator.

The Roden Co.'s Plant in Alabama

By C. A. Tupper*

Description of a carefully designed and well equipped plant in which no expense has been spared to bring the working costs to a minimum. The installation is replete with examples of permanent steel and concrete construction as applied to coal mining and some interesting conclusions relating to long-distance electric transmission are presented.

*Consulting engineer, 389 Thirty-first Ave., Milwaukee, Wis.

The property of the Roden Coal Co. consists of about 4000 acres in Bibb County, Ala., in the famous Cahaba field. The point selected to work this area was on the L. & N. Ry. and the Southern Ry., 31 miles south of Birmingham, at a point afterward named Marvel.

The country in this locality is a succession of hills and valleys. At Marvel, the workable seams outcrop on the side of a hill which is separated from the main line of the railway by a valley and another intervening hill, approximately 125 ft. high. The expense of bringing the railway to the outcrop was prohibitive, and it was decided to bridge the valley to the top of the interevening hill and place the tipple on the far side. The connection to the railroad was then made with a 3-track siding on a 2 per cent. grade for the first 2000 ft. and 1¼ per cent. for the remaining distance from the main line of the railroad to the tipple.

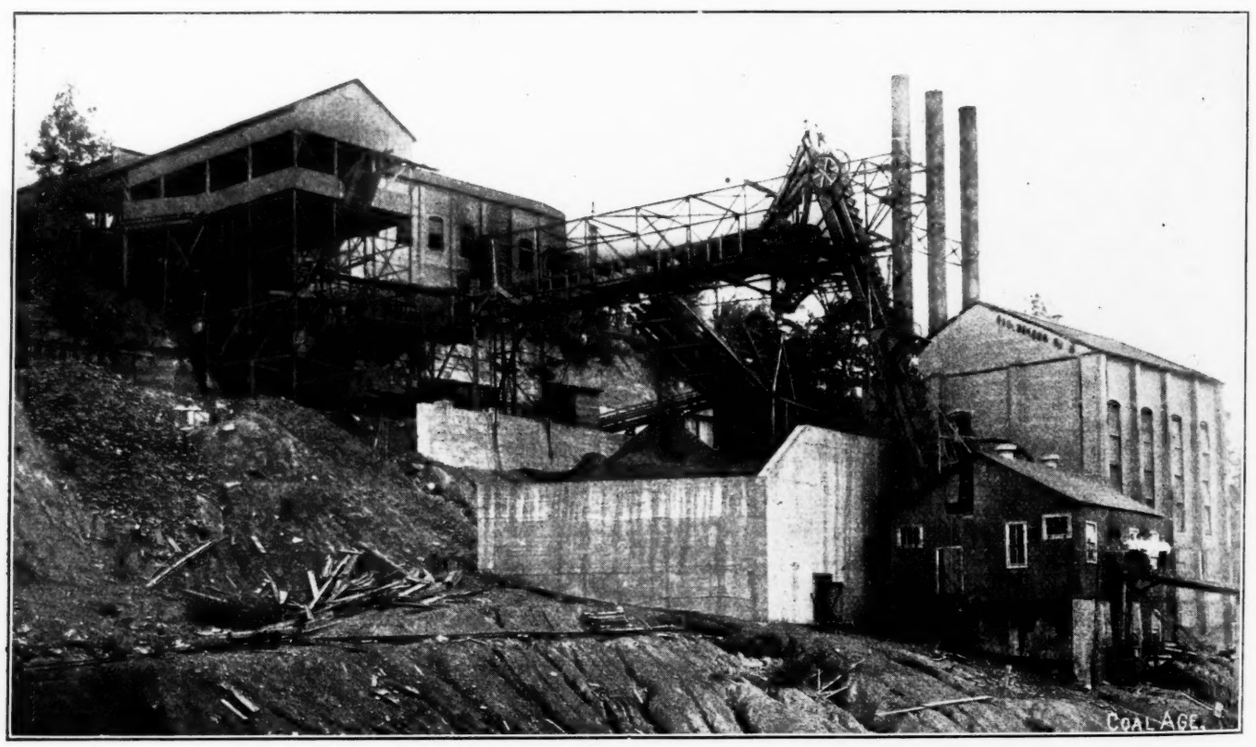
Steel Viaduct and Car-Haul

The total length of the viaduct is 600 ft., of which 300 ft. is steel, fabricated by the Converse Bridge Co., Chattanooga; the maximum height is 78 ft., and it contains about 50 tons of steel. It carries two tracks of 42-in. gage, 9 ft. centers, laid with 40-lb. rail, and was erected entirely by the Roden Coal Company.

In considering the type of structure to place at this point, cost of material, erection and upkeep were all thoroughly studied, accurate estimates being made for both a wooden and steel structure, and the advantage was decidedly in favor of the steel. The estimates of the engineers proved finally to be correct as both the cost of material and erection were less than if lumber, of even 80 per cent. heart stock, had been used.

The grade of this viaduct is 8.9 per cent.; at the bottom end, one track breaks to 21 per cent. in order to reach the bottom seam, the other continuing at 8.9 per cent. At the upper end, the two tracks split into three; the two outside, or empty tracks break to a 4.8 per cent. grade for 240 ft., and thence run on 3 per cent. for 156 ft. to the top of the empty car-haul. The middle or loaded track continues for 225 ft. to the knuckle, from which point it drops for 150 ft. on a 2 per cent. grade, thence for 109 ft. at 2.5 per cent. to a Phillips automatic dump. From this point the track drops on a 15 per cent. grade for 15 ft., giving the empty cars ample velocity to take the kick-back and be returned to either one of the empty track car-hauls.

A steam brake is provided for holding the loaded trip after it is over the knuckle, and the operation of this brake, the dump and the switch from the kick-back, is all handled by one man. In approaching the dump the loaded cars are weighed in transit, a long, 12-ft. platform scale being installed 12 ft. ahead of the dump. The scale house is built over the scale, and the latter is provided with a quick weighing attachment which greatly facilitates operations. A small



General View of the Roden Coal Co.'s Plant, at Marvel, Ala.

In any commercial operation, the object sought is to secure a maximum output at a minimum cost. The plant described in this article, data for which were prepared by W. F. and G. C. Thornton, the engineers who designed it, and B. F. Roden, president, has been built with that end in view, rather than with the idea of conserving on first cost and thereby eventually creating a higher net cost of production.

belt conveyor, motor-driven, handles the miners' checks from the dump to the weighman. The two car-hauls, 42 ft. long, and having a grade 20.2 per cent. and capacity of 100 cars each per hour, are driven from one line shaft, which in turn is driven by a 15-hp. 220-volt, 3-phase, 60-cycle induction motor, back-geared.

The Tipple

The tipple, of steel construction throughout, is equipped to screen slack, egg, nut and lump, and has a capacity of 250 tons per hour. Lump and mine-run are loaded on the outside track. The screens are provided with blank plates to cover any of the various openings. The coal is dumped from the mine cars into a bin of 25 tons capacity, whence it is automatically fed to the screens; the screens and feeder are driven by a 40-hp., 220-volt, 3-phase, 60-cycle induction motor, back-geared. All the chutes and screens are adjustable for height and load parallel to the track; by making these chutes long enough, and raising them as the car is loaded, the breakage of coal has been reduced to a minimum.

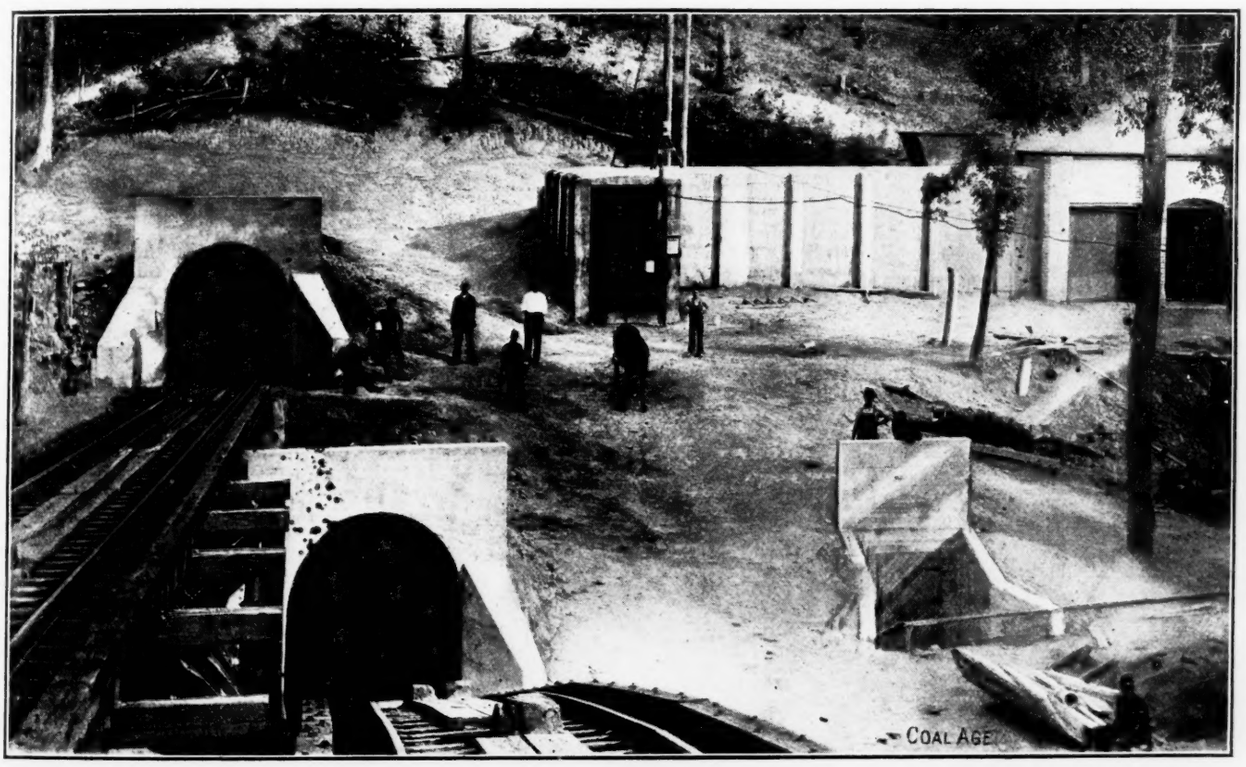
All the motors used on the tipple are constant-speed and are back-geared in order to secure the necessary low speeds without going to the expense of slow-speed motors; they are provided with special oil cases for the gearing. The screen load is thrown on the motor gradually through a friction clutch. The total capacity of the screens is 250 tons per hour.

For loading lump, the original design of tipple called for a curved chute from the end of the screen to the car but in practice this had to be abandoned, as the velocity attained by the coal caused considerable breakage; the chute being necessarily a spiral, the difference between the maximum and minimum limits of raising and lowering the outer end to attain a slow or rapid velocity was too small for practical purposes. For this was substituted a straight chute 4 ft. 6 in. wide, and 14 ft. long, hung at right angles to the center line of the screens, and sloping about 30 deg. To bring the coal from the screens to this chute without having a maximum drop of more than 18 in., which was prohibitive, a small connecting chute was built of angle-irons, 2x2½x⅜ in. One flange of these angles was cut out to fit over a 1¾-in. rod which was supported on the framework immediately under the end of the screen, the other ends, beveled on a 30-deg. angle, rested loosely on the surface of the 14-ft. chute, thereby forming a warped surface over which the coal flows easily and with no breakage; furthermore, this surface is adjustable to all positions of the loading chute, as it is lowered or raised to suit various cars.

The slack coal goes into a 12x24-in. flight conveyor and is conveyed to a 2500-ton, raw-coal bin located on the ground below the tipple. By means of a concrete tunnel under this, the coal is drawn off on apron conveyors to the washer jigs. This washer, like the other equipment, is fireproof, being constructed of concrete and steel throughout. The washer is driven by rope drive from a double engine. The refuse is sluiced away. Only one man is employed at the washer, which is handling 800 tons per day of 10 hours.

Hoisting and Power-house Machinery

It was decided as impracticable to have a straight pull from the hoisting engine, down the main slope and, as the contour of the ground permitted little choice for the site, the hoisting engine was placed in one end of the power house building, at right angles to the tipple center line; this necessitated two 8-ft. sheave wheels (for two 1¼-in. wire ropes, one for each slope) suitably mounted on steel head frames, to carry the rope "around the corner."



Concrete Mine Entrances and Beginning of the Steel Viaduct

The power house is 38 ft. wide and 88 ft. long and will be increased in length as additions to the plant are made. The walls are 17 in. brick, with pilasters spaced 11 ft. 1 in., steel roof trusses and tile roofing laid on angle-iron purlins; a 10-ton, hand-power crane runs the length of the building, the runway being supported by brick pilasters. This crane was installed when the two side walls were finished and before the end walls were put up, and was of material assistance in erecting all the machinery. This building is lighted by 19 windows, each having double sashes operated on pivots. Glass-top ventilators are placed in the roof and the building is provided with a basement for the piping, traps, etc.

The equipment of this building at present consists of a 28x48-in. double-cylin-

der, double-drum, first-motion hoisting engine. The drums are 8 ft. in diameter, and each has a capacity of 5000 ft. of 1¼-in. wire rope; the flanges are detachable and will be replaced with higher ones later, as the slope lengthens. The engine is fitted with steam-operated brakes, friction and reverse, and Corliss valves, although the dashpots have been left off, to be added later when length of haul becomes a serious item. Extension piston rods, through the back cylinder head, equipped with crossheads, are provided to take up the weight of the piston. There is 140 lb. steam pressure at the throttle. This engine handles 15-car trips, each car weighing loaded 5000 lb., at a speed of 1500 ft. per minute.

Other units are a 250-kw., 3-phase, 60-cycle, 2300-volt generator, direct connected to an 18x24-in. Corliss engine, having a speed of 120 r.p.m., and a 25-kw., 125-volt, direct-current generator, direct connected to a high-speed 8x7-in. engine, running at 350 r.p.m.; this latter is used as an exciter set and is of sufficient capacity to take care of additional units. There is also a 40-hp. motor-generator set which is used as an exciter set while running, and the engine exciter is used only for starting and as an emergency unit.

The decision to adopt alternating current was due to proposed additional openings to be made later, a mile or more from the present one, and the intention to provide power for both mines from this one plant. The flexibility of the alternating current was also taken into consideration. Then, again, although the first cost of alternating current machinery is slightly in excess of direct-current apparatus, the low maintenance and operating cost of induction motors, as compared with direct-current motors, is so great that in 12 months it would more than pay the difference in first cost.

Boiler House and Steam Lines

The boiler house, 41x51 ft. 3 in., is located 79 ft. below, and 197 ft. horizontally from the power house. In locating this building, advantage was taken of the profile of the ground for fuel- and ash-handling. Coal is drawn from the slack bin into a one-ton side-dump car which is pushed on a track running into the boiler house on top of the furnaces, on a 0.5 per cent. grade in favor of the load. The ashes are drawn from hoppers under the furnaces into a similar car, operating in a concrete tunnel running the length of the building; this car, when loaded, is pushed out on the track supported on a pole trestle along the hill side, and the contents dumped down the bank.

The building is similar in construction to the power house and contains three 300-hp., vertical water-tube boilers, having 150 lb. working pressure, set singly, in steel casings, and equipped with automatic stokers, feed-water regulators and automatic valves. Although at first glance this may appear an unnecessary refinement in equipment for a coal mine, it is justified by the saving in labor, one man handling this entire 900-hp. plant, including the firing and ash removal.

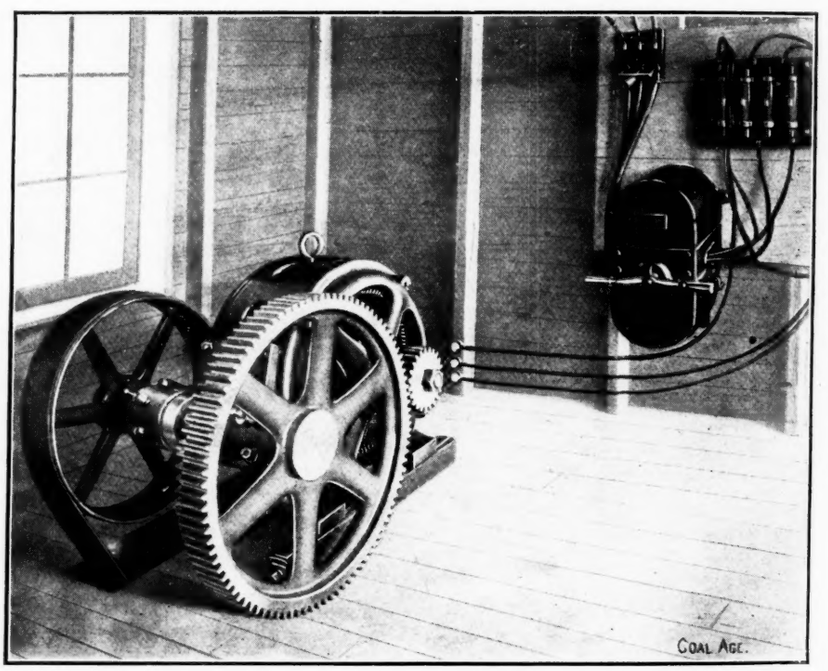
The 12-in. steam main from the boilers to the power house, 168 ft. long, is carried on a suspension bridge over the three side tracks. The span is 99 ft.; difference in elevation of the foundations of the towers is 49.75 ft., and of the tops 27.88 ft. The bridge consists of two ⅞-in., galvanized, steel-wire cables, spaced 48-in. centers, and ⅝-in. suspension rods, with longitudinal spacing of 5 ft. The minimum clearance from the top of rail is 22 ft. The bottom tower is 35 ft. from the track and behind a 6-ft. bank, while the upper tower is on the top side of a cut, 41 ft. above the rail, so it is plain that the danger of damaging either tower by a derailed car is eliminated. The grade of the bridge floor is 15 degrees.

All steam piping is of standard-weight pipe, lapped at the ends, and having rolled-steel flanges, forming a "Van Stone" joint. The connection from the 12-in. main to the boiler header is made with a 12-in. Harter flexible joint, which takes care of all expansions, the main connecting at the upper end to a long-radius, cast-steel L, securely anchored in the basement of the power house, from which distribution is made to the machinery. All valves are Fairbanks, extra heavy.

General Utility Shops

One large building houses the blacksmith, machine and carpenter shops. It is 35x82 ft. and 16 ft. high, of brick and steel construction, tile roof and contains a circular saw, boring machine, lathe and planer in the carpenter shop, and a power hammer, down-draft forge, blower, exhaust fan, pipe-cutting and threading machine, drill press, emery grinder, etc., in the machine shop. All machinery is driven from line shafting, to which is belted, in the carpenter shop, a 10-hp., 220-volt, three-phase induction motor, and, for the other machinery, a 15-hp., 220-volt, three-phase induction motor. A branch from the empty coal track outside leads into and runs the length of the building, ending over a concrete-lined pit in the machine shop for repair of the electric mine locomotives, of which there are at present two in operation, both being 4-ton Westinghouse Baldwin, having wrought-steel frames and fitted with arc headlights.

The locomotive trolley poles are located to one side of the center, which is necessary in low-roof mines to prevent accidents to employees. In addition to placing the wire to one side of the entry close to the rib, additional safety is provided by a wooden guard on each side of the wire which extends from the roof to 3 or 4 in. below the wire. While only 250 volts is carried on the trolley wire, which would not do material damage to persons coming in contact with it, the extra precaution of the wood guard has reduced danger of accidents of this kind to a minimum. This building, as well as the boiler and power house, is lighted with three 5-light cluster, 40-watt, tungsten lamps.



Conveyer Motor, Showing Potential Starter and Fuses on the Right

The Water Supply

Unfortunately, the nearest source of an abundant and pure water supply is over a mile from the town. This, of course, means pumping all the water used both

for domestic and boiler purposes. For the former, a storage supply is provided by a concrete tank of 50,000 gal. capacity, set on a concrete tower, 60 ft. above the ground. For the latter a 500,000-gal. concrete-lined reservoir was built on the crest of a hill beside the power house; from this reservoir, water flows to the feed pumps and later, when condensing apparatus is installed, will supply the condensers also. At present it is necessary to feed cold water to the boilers, but this is only temporary.

The proposition of handling the water from the stream is taken care of by two three-stage centrifugal pumps, direct-connected to three-phase, 2300-volt, 60-cycle induction motors, operating at a speed of 1700 r.p.m. One of these has a capacity of 150 gal. per min., and the other 250 gal. per min.; both operate under a 300-ft. head. The motors are 35 hp. and 60 hp., respectively, and only one pump is operated at a time, the other being held in reserve.

This plant is located in a brick building, 12x16 ft., and about 10 ft. from the bank of the stream. The motors are started and stopped by starters, located over a mile and a half away, in the power house. This use of starting apparatus, with a remote control, is one of the advantages of alternating current, as no extra or increased sizes of wire are necessary. The 4-in. suction from the pump leads into a sump on the outside of the building, which is connected to the stream by a 6-in. pipe provided with necessary strainers, check valves, etc. The building is waterproofed 6 ft. above the ground to prevent damage to machinery through high water.

It might be well to mention here that this source of supply was finally decided upon only after an exhaustive series of analyses of the water at the two extreme seasons of the year. A 6-in. cast-iron pipe carries the water from the pump to the 50,000-gal. tank, and thence to the reservoir in a 4-in. pipe, suitable valves being placed to turn all the flow into the latter without interfering with the domestic supply.

Electric Transmission System

The pole-line construction conforms to the best standards for this work. All poles are either 35 or 45 ft. long, spaced 100 ft. apart, and of good, straight, sound chestnut. Main-street poles, running through the town, carrying circuits of 2300 volts, are 45 ft. in length and placed 5 to 6 ft. in the ground; all corners are substantially guyed. On every fifth pole is placed an arm which extends out to the center of the road, about 20 ft. above the ground, on the end of which is hung a 60-watt tungsten series light, there being 26 of these distributed along the highways, on an independent 2300-volt circuit.

On each pole danger notices are printed in large black letters on a white background, which can be read from a distance. Some of the poles are equipped with steps from the top to within 8 ft. of the ground, and the management found that to protect the public as well as the company, it would have to prevent young boys from ascending these poles and stealing insulators; therefore, in addition to the "Danger" sign, there were placed on these stepped poles a $25 reward notice. Since this, there has been no trouble from that source whatever.

The Ventilating and Direct-current Plants

The ventilating equipment is in a large general building, divided into three compartments. One end contains the fan, 72 in. in diameter, delivering 100,000 cu.ft. of air per min. at a 1½-in. water gage and 300 r.p.m. The fan is belt driven by a 75-hp., 2300-volt, three-phase induction motor and starter. A reinforced-concrete tunnel carries the air from the fan to the two air courses. Concrete is extensively used in the mines for overcasts, etc. The middle compartment is a hospital for rendering first aid.

The third compartment, separated from the rest of the building by a 13-in. brick wall, contains a motor-generator set. Provision is made for three sets, but, at present, a 75-kw., 250-volt, direct-current generator, driven by a three-phase, 2300-volt, 60-cycle, 112-hp. induction motor, and a starter, is all that is necessary. The motor-generator set is mounted on an iron sub-base, and the speed is 650 r.p.m. A skeleton wood switchboard, for the outgoing mine circuits, completes the equipment of this room.

The machinery at present installed in the mine using the direct current supplied by this generator, is: Two locomotives, two small triplex sinking pumps, driven by back-geared, 15-hp. electric motors, two electric air rock drills, one 250-gal. triplex station pump, back geared to a 40-hp. motor, and six 20-hp. electric single-drum hoists. All the power leads run down the lower air course and at intervals branches are tapped off and run where necessary. Little water has been encountered so far in the mines, but a station pump will be installed later. All the motors for the plant were supplied by the Allis-Chalmers Co., Milwaukee.

The mine is being equipped with a complete telephone system, also electric indicators for showing the engineer the location of the trip he is handling. Shotfiring will be done entirely by electricity from the outside of the mine, while a system for checking the men going in and out will be established to prevent accidents happening from firing shots while anyone is in the mine. Electric air drills are being used for drilling the sandrock top in the headings and air courses.

Sociological Conditions

For the use of the miners, a bath house of brick will be built, equipped with 20 showers having both hot and cold water, and a locker for each man. The building will be divided into two compartments, one for the colored and the other for the white miners. A system of steam heating will be installed and an attendant, in charge at all hours, will be responsible for the proper care of the building.

The fire protection at Marvel has been given careful consideration. Fire hydrants are established at regular intervals throughout the camp, and hose carts are placed at convenient points, with plenty of underwriters hose to reach any desired locality. The water pressure from the concrete tank alone is sufficient to throw a stream from a 2-in. nozzle the necessary distance, while the pressure obtained when the pump is in operation and feeding directly into the mains is, in some places, more than 150 lb. per sq.in. Fire companies have been organized to fight any conflagration which might occur.

All the miners' houses are wired and the light is supplied at a flat rate, which is charged in with the rent. All lamp renewals are purchased at the commissary by the consumer. For use in the mines, 220-volt lamps are provided, but 110-volt lamps are used in the houses.

A 10-ton ice plant will be located convenient to the commissary, and a refrigerator will keep all the fresh meats in perfect condition until used. Ice will be supplied to neighboring camps at a minimum charge throughout the summer. An amusement hall, having opera chairs and seating 600 people, provides for moving-picture shows weekly.

Experiments on Explosive Dust at Pittsburg Testing Station

Experiments made at the Pittsburg testing station have shown that a charge of 1¼ lb. of black powder is capable of igniting 60- to 80- or 80- to 100-mesh coal dust and propagating an explosion. Dust larger than 60-mesh was not ignited. A 2½-lb. charge, with 2 lb. of clay tamping, ignited 60- to 80-mesh dust and propagated an explosion. Also 40- to 60-mesh dust mixed with 20- to 40-mesh was ignited, but only a partial explosion took place, although the indications were that a still larger charge of powder, with a correspondingly increased concussion and heat, would produce a complete explosion. Under mine conditions, where there is an abundance of fine dust to sustain the flame, coarser sizes of dust may be able to propagate an explosion if the shot is very large; but until further tests are made 20-mesh dust is the dividing line between fine coal and dust.

Water Purification for Collieries

Special Correspondence

A growing tendency toward the establishment of large central power plants at the coal mines and a universally increasing demand for colliery bathing facilities are both emphasizing the need of water purification at mining plants. The first of a series of articles on water-purifying processes and apparatus.

The water problem in connection with colliery work, includes not only the question of securing the most convenient or economic method of ridding the mines of this element which frequently threatens to submerge the workings and to endanger the lives of the men underground, but, especially in recent years, has come to include the question of treatment both for use in steam boilers and for bathing and cleansing purposes. Modern practice will probably render these latter phases of the subject of greater and greater importance as time goes on because of two tendencies which have become increasingly evident.

The first of these tendencies is connected with the economics of power supply. There is a steadily increasing opinion that the problem of cheap power in areas adjacent to coal mines will be solved, ultimately at least, by the institution of large electric generating stations at the collieries or as near thereto as can be conveniently arranged. The cheaper forms of coal which can not be profitably transported can then be burnt here and the steam so obtained utilized to drive electric generators supplying a distribution system which may spread over hundreds of square miles of country side. This achievement is perhaps nearer actual accomplishment than is generally supposed, and even to-day we have such a system fore-shadowed in more than one large group of collieries where a central electric-generating station supplies all the power necessary for the various operations of the plant both above and below ground and in some cases for the lighting of the adjacent villages. It needs but a simple extension of this system to usher in a new era of electric power supply.

The second tendency which was referred to above, is the growing feeling that provision for the cleanliness of the miners is absolutely necessary. In Germany, France and Belgium, extensive miners' bathing installations have been equipped, and contrast most favorably with the inefficient means formerly adopted in the miners' own cottages in order to secure an occasional bath. The influence on the health and morality of the miners in those areas where such accomodations have been provided, is stated to be considerable, and there is every probability that before long similar installations will be found at most of the colleries throughout the world where the management is of an up-to-date character.

Necessity for Pure Water

For both the purposes mentioned above, water is necessary; and furthermore, it must be of a clean and pure nature. Unfortunately, however, most of the water pumped from underground workings not only contains a large amount of solid matter in suspension, which has been acquired by its passage through the earth, but also frequently becomes impregnated with iron salts and other salts in solution, that render it unfit for direct application to either steam production or other purposes. It will be seen that the subject of water purification for collieries is, even at the present day, of considerable importance, and this importance will grow as time goes on. It should therefore prove a matter of interest to review briefly some of the types of water-purification apparatus which are available for special adaptation to the needs of colliery work.

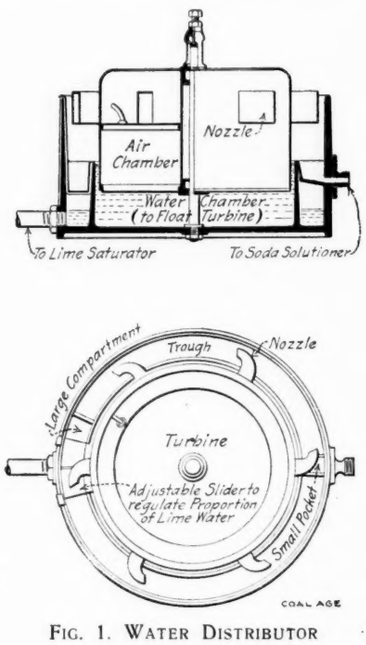


Fig. 1. Water Distributor

It is not proposed to spend much time in this article on the question of the removal of solid matter in suspension in the water pumped from a coal mine. As a rule, such matter can be removed by means of settling tanks, into which the water is allowed to pass and rest before being drawn off for boiler or washing purposes. Where this treatment is not sufficient the water may be passed through beds of gravel or sand, which still further arrest the finer portions of suspended matter. In some cases also, the coagulating properties of aluminates are employed to bind the floating particles together into a more or less gelatinous mass; and this treatment, combined, if necessary, with a suitable filtering process is sufficient to remove the impurities that are mechanically held in the water.

By far the more serious problem, especially in the case of boiler-feed supplies, is that of getting rid of the disolved matter in the water. Fortunately, the impurities contained in solution in the majority of waters are limited to a small number of substances, and, generally speaking, the trouble which is to be most apprehended is that arising from the presence of bicarbonates of lime and magnesia (which produce what is known as temporary hardness) and from the presence of sulphates of lime and magnesia which give rise to permanent hardness, that is to say, hardness which is not removed by boiling the water.

There may also be found air and carbonic acid gas in solution, and, in the case of mine water, free acid, such as sulphurous acid, small traces of chlorides and nitrates and sometimes a considerable amount of iron salts such as bicarbonate of iron. Of these the lime and magnesium salts are the most important and are the impurities with which it is most generally necessary to deal. Obviously, in the matter of boiler-feed supplies, it is advisable to get rid of the impurities before the water is allowed to enter the boiler, although the use of compounds, which deposit more or less dubious sediments in the boilers is still prevalent. The methods usually adopted for the preparation of feed water before it enters the boiler may in general be divided into two classes, the hot and the cold treatment.

The Cold Process

In order to get rid of the temporary hardness of a feed water, by chemical treatment without the use of heat, the bicarbonates are precipitated by a lime-water solution and the sulphates are precipitated by soda ash. The cold or purely chemical treatment, usually involves a certain amount of storage capacity for the water which is being treated and it is necessary to make sure that the chemicals are added in just the proper proportion, since otherwise lime might be passed over into the

boilers, there to be deposited as scale. The cold process is particularly adapted to use where hard water must be softened before it can be used for bathing or washing purposes. It is also no less frequently adopted in connection with steam raising plants.

The alternative method of hot treatment is available where engines are being run, and consists in the employment of exhaust steam to preheat the water before it passes to the boilers.

There are numerous types of hot and cold water softeners at present installed at colliery plants and the mechanical details of some of these will be referred to in this and succeeding articles. Before passing to this, however, a preliminary reference may be made to the removal of iron compounds. In a case to be mentioned later, the mine water was discharged into a brook, and complaints were raised because of the contamination of the brook by the ochre-

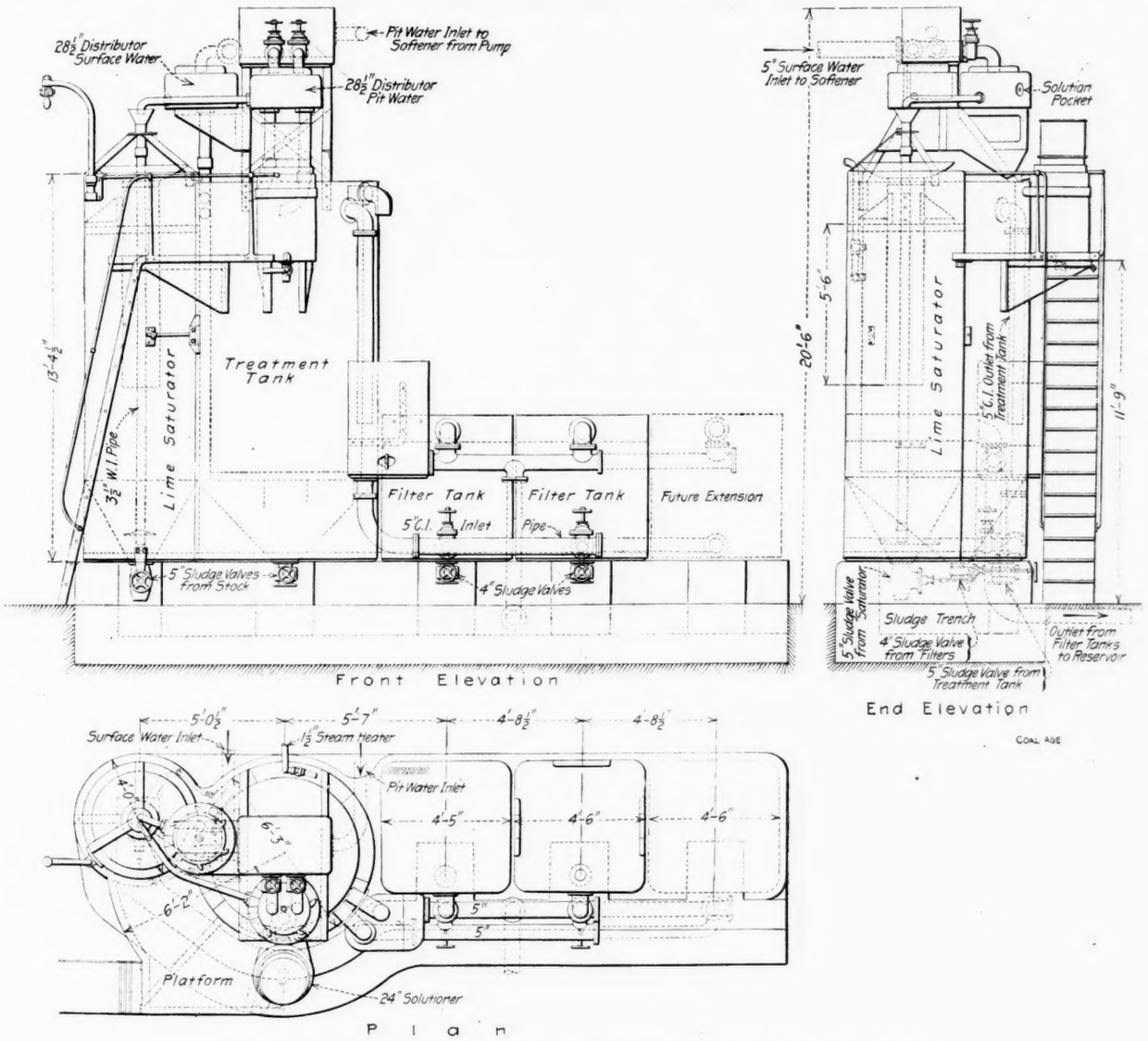


FIG. 2. HARRIS-ANDERSON WATER SOFTENER, CAPACITY 5000 GAL. PER HOUR

This heating often eliminates the necessity for the use of lime, because the temporary hardness is removed by boiling the water, and the permanent hardness is either simultaneously or subsequently treated by means of soda ash. Where exhaust steam is used in this way there is the possibility of oil being brought over from the engine, and therefore, it is not unusual to find an oil eliminating device as a part of the lime softening process.

colored mine water. It was here necessary to install a self-cleansing filter in order to obtain a clear effluent. Still another phase of the subject is the use of colloidal aluminum, which appears, from recent investigations, to offer some promising results. This matter will be treated in further detail later on.

HARRIS DISTRIBUTOR

One of the points which demands careful attention in the treatment of water, is the addition of just the precise amount of reagent that is necessary to reduce the hardness to the required degree; and one of the chief aims in the construction of modern water softeners is to effect this admixture with as much ease and certainty as possible. As an illustration, the distributor used in the water softener made by the Harris Patent Feed Water Filter Co., Ltd., of Newcastle-upon-Tyne, may be mentioned.

This device, shown in Fig. 1, effects an automatic and accurate separation of fractional portions of the total flow of water, the relative proportions being unaffected by changes in the rate of flow. It consists of a small turbine, floated by the water which flows into it. The water leaves by bent nozzles and thus the turbine is rotated about a vertical axis. The water flows uniformly from the nozzles into an annular trough and this trough is divided into two compart-

ments, one of which is just such a fraction of the whole trough as to correspond to the fractional part of water that it is required to separate from the main flow.

The separated portion of water is led away by a special pipe, and evidently its proportion relative to the whole is not disturbed by the total rate of flow. The water thus diverted is converted into a saturated reagent when taken to the saturator or solutioner. If saturated lime water is to be made, the amount separated is usually about one-tenth of the total flow, variation of the amount being made by the adjustment of a slide; while if caustic soda or some other strong reagent is used the proportion is much smaller, varying from one-fiftieth to one-two-hundredth part of the total. In the latter case separation is effected by means of small knife-edged pockets placed radially in the annular trough.

Where lime is used as a reagent, the water separated from the distributor passes into a conical-bottomed tank, charged with slaked lime. The water enters through the lime, thus agitating it and disolving as much as possible. From the upper part of the tank it passes out, after settling, to the reaction tank where it is mixed with the main water supply by means of baffle plates. A certain amount of sludge is separated in the reaction tank and the water is further cleared by being passed through a mechanical filter bed of wood fibre, placed either internally or externally with respect to the main tank.

Where soda or other readily soluble reagents are used, a solutioner of circular form, containing three concentric cylinders, nested in one another, is provided, as shown in Fig. 3. Successive annular spaces are thus formed. The outer containing cylinder is notched at its upper edge and leads to the delivery spout. The second cylinder is fixed so as to have its upper edge a little way above the top of the third cylinder, which latter may be adjusted vertically by means of a screw nut and is notched at its upper edge. The fourth or innermost cylinder is carried higher than all the others and is fixed. It contains a gauze cage, placed at such a height that the bottom is an inch or two below the level of the notch on the outermost cylinder. In this cage the reagent to be dissolved is placed.

Operation of Solutioner

Now, if the movable cylinder is adjusted so that its notch is slightly above that on the outer cylinder and a pipe is lead from the distributor pocket into the space between the innermost and the next cylinder, the water flowing from the pipe will pass down this annulus and up the outermost space, the water level being that of the outflowing water. The innermost cylinder will also be filled with water and this, coming into contact with the reagent, dissolves it, the resulting solution being of higher specific gravity than the water passing down the inner space to the bottom of the solutioner.

The flowing water then takes up the solution at the bottom of the tank and mixes with it, so that the outer annulus carries a solution of greater density than that in the mixing cylinder. As the overflowing solution becomes stronger the level of the water in the inflow space rises to maintain hydraulic balance and continues to rise until the solution becomes strong enough to bring the level

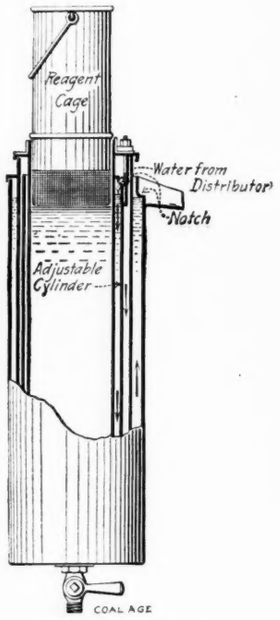


Fig. 3. Solutioner

of the water up to the notch on the adjustable cylinder. When this happens, the water partially overflows at this point and this overflow, passing down the intermediate space, mixes with the solution at the bottom of the outlet and prevents it from becoming stronger.

Thus at any setting, the strength of the outflow solution automatically adjusts itself to a constant value, and by raising the adjustable tube, the strength of the solution is raised, and by lowering it is weakened. Within working limits the strength of the solution is independent of the rate of flow through the solutioner and of the temperature of the water. Moreover, at low loads, or on standing, the increasing density of the innermost column of solution causes the height of this column to diminish and so carries the liquid out of contact with the reagent so long as the outflowing solution is of the proper strength. Waste is thus revented.

A Harris-Anderson water softener of 5000 gal. capacity is shown in Fig. 2. This is dealing successfully with water from two different sources, at a colliery in South Wales. One of the supplies is a surface water and the other is pumped from the mine. As these waters are of different strengths, two different distributors are required; one operating for the surface water and the other for the mine water. Beyond this point, however, the same apparatus deals automatically with either water supplied to it.

(To be continued)

A Combination Coal Mine

A new freak in the geology of the Rocky Mountains has recently been disclosed in the development of a mine producing anthracite, semi-anthracite and bituminous coal in addition to some coke. This rather amazing mine is owned by the Moffat Coal Co., and is located about 18 miles northwest of Steamboat Springs. The president of the company, F. M. Perry, is credited with the following statement relative to the different products of the mine:

The bituminous coal occurs at the top of the series with a semi-anthracite second and the anthracite and coke at the bottom. In common with many portions of Colorado, this district has evidently been the scene of great volcanic activities and numerous intrusive dikes are encountered. It is due to these igneous intrusions that the many different grades of coal were formed.

While these dikes ordinarily take the form of vertical fissures, it is not unusual for them to spread between the intervening strata. Under these conditions, they often have the appearance of the ordinary stratified rock and where found in Colorado are designated as "sill."

The different forms of coal can, no doubt, be easily accounted for by their proximity to these volcanic rocks. The bituminous coal at the top of the series is probably the natural form of occurrence in this region, while the change in the quality of the remainder of the seams has been caused by the different degrees of metamorphism to which they have been subjected, the coked portion representing the maximum metamorphism.

While the year 1910 saw more coke produced in the United States than ever before, the increased value was more than offset by the higher cost of the coal used. The output for 1910 was 41,681,410 short tons, valued at $99,696,267; the output for 1909 was 39,315,065 tons, valued at $89,965,483. While the increase in value was $9,730,784, there was an increase in the cost of the coal used which amounted to $12,604,732.

News of the Coal Strike Situation

Special Correspondence

No progress toward a settlement of wage agreements has been made in either anthracite or bituminous fields.

Great Britain has passed a minimum wage act which is expected to end the strike. Strikes in Germany and France have collapsed.

No definite progress toward reaching agreements between operators and miners has been made during the past week in either the anthracite or bituminous fields. While anthracite operators declare they are ready to discuss the miners' demands, at any time, the latter maintain that negotiations having been broken off, the first effort to renew them must come from the operators.

A week has passed since the bituminous operators and miners met in conference at Cleveland, and as yet there has been no progress toward agreement on wage scales for the states of Pennsylvania, Ohio, Indiana and Illinois.

The policy committee of the United Mine Workers met in Cleveland, Mar. 25, but deferred taking action, pending the outcome of the conference of bituminous operators and representatives of the miners. Thirty-two operators and 32 representatives of the miners constituted the full conference at Cleveland, which began Mar. 20. There were eight representatives on each side of the controversy from each of the four competitive states.

The miners presented their demands for a 10 per cent. increase in wages; a reduction in working hours from eight to seven per day, with five hours on Saturdays; provision for an unlimited "check-off"; payment on the run-of-mine basis, and weekly pay days. The operators took the same position as that taken at the first meeting of the joint-scale committee in Indianapolis last January. They contended for a 10 per cent. reduction in wages, an increase in the number of working hours and denied the balance of the miners' demands in general.

For two days, the full conference of 64 members discussed the demands of the miners and the counter proposition of the operators. Failing to agree, the whole question was referred to a subcommittee of eight operators and eight miners, constituting the joint-scale committee which reconvened at the same time that the main conference assembled.

Meeting of Joint Scale Committee

At a meeting of this subcommittee, Mar. 22, the miners again renewed their demands and the operators continued to argue for a 10 per cent. reduction in wages. Eventually, the operators suggested a continuation of the present scale for two years on condition that there would be no suspension of work at the mines under any circumstances. A vote showed the miners unanimous in their rejection of this proposition, and the subcommittee so reported back to the full conference.

Subsequently, all the several compromise offers which were made by the operators were voted down by the entire miners' representation. It being agreed, however, that a suspension of negotiations for an indefinite period would have the same effect on the industry as the declaration of a strike, it was voted to postpone further discussion until Tuesday, Mar. 26. Accordingly, the conference again met on this date, but last reports fail to show that any progress has been made toward reaching an agreement. The miners, throughout the negotiations have firmly held to the letter of their original demands. The operators have offered and withdrawn several compromise measures, without effect.

The following figures show the total number of miners employed in bituminous fields controlled by the miners' union:

Arkansas	6,000
Illinois	73,000
Indiana	22,000
Iowa	17,000
Kansas	13,000
Michigan	4,000
Missouri	10,000
Montana	4,000
Ohio	47,000
Oklahoma	9,000
Pennsylvania	82,000
Texas	4,000
Utah	3,500
Wyoming	8,000
Washington	7,000
Total	309,500

In the nonunion bituminous fields, 50,000 union miners are said to be employed. The total number of mine workers for each state in the nonunion fields is approximately as follows:

Alabama	23,000
Colorado	15,000
Kentucky	21,000
Maryland	6,000
New Mexico	4,000
Tennessee	12,000
Virginia	7,500
West Virginia	69,000
Central Pennsylvania and elsewhere	75,000
Total	232,500

The total number of mine workers in the anthracite field of Pennsylvania is approximately 175,000.

The Anthracite Controversy

In the anthracite region, independent operators, through John C. Haddock, president of the Plymouth Coal Co., have issued a statement, in which it is contended that the individual coal owners should be allowed a better price for their coal, which is taken over by the large coal-carrying companies, than that afforded by the contracts that are based on 65 per cent. of tidewater prices. It is further argued that, "the proper adjustment of this item would permit a reasonable concession to the mine workers." To this statement the larger companies, have replied by pointing out that the willingness of the independents to advance wages is based entirely upon their ability to advance prices.

The so called 65 per cent. contracts, by which the coal of the small owners has been taken over and marketed by the larger companies and coal-carrying roads, have been temporarily suspended, and for the next three months the individual operators will be permitted to dispose of their own coal at such prices as they are able to command. It is argued that this opportunity for making large profits will hold them in line with the general policies of the larger companies.

Government Intervention

Repeated rumors are current regarding the possibilities of federal intervention in an effort to avert a coal strike. While, beyond doubt, Congress and government officials at Washington are making every effort to keep well informed as to the merits and progress of the controversy, it is not likely that definite action will be taken by them prior to a demonstration of the fact that the operators and men will not be able to agree through their own efforts.

Representative Lee, of Pottsville, Penn., has proposed a bill providing for an extension of the Erdman act to apply to the coal-mining industry. The bill is at present under consideration by a committee of the House of Representatives and probably much valuable testimony will be adduced in this connection from the witnesses to be summoned. Serious objections, however, are raised against the provisions of the bill itself, in that its extension to other commodities and industries than coal and coal mining, would seem to be logical and necessary in the event of its becoming a law.

Minimum Wage Bill Passed in England

At the end of the fourth week of the British coal strike a minimum wage bill has been passed and becomes a law. This bill recognizes the principle of the minimum wage, but does not specify the amounts for which the miners have held out so long. It is therefore unlikely that the enacting of this measure will at once to settle the strike, although it will pro-

vide means by which the miners may return to work, knowing that such a minimum wage is assured them as can be agreed on in the various districts.

A week ago this bill had passed the committee stage in the House of Commons but was temporarily abandoned because the leaders of the miners' federation held out for the stipulation in the bill of the definite sums which they demand as a minimum wage; namely, 5s. a day for men and 2s. for boys employed underground. Considerable opposition to the measure had previously been manifested, and the government itself refused to incorporate any such provisions in the bill.

Conferences Were Resumed

Conferences were resumed through the intermediation of the government on Mar. 25, but were unproductive of results. The conference on the twenty-sixth was short-lived, and following it, the Premier immediately went to the House of Commons and announced that the government had put forth its best efforts to secure a settlement between operators and men, and had completely failed. The minimum-wage bill was forthwith passed by a large majority and sent to the House of Lords, which held a special session to receive it.

Some breaks in the ranks of the miners were reported during the week. One thousand men have returned to work at mines in Lanarkshire, Scotland, as well as a number at other places in Scotland and Wales. The situation in many towns is becoming more and more desperate, and it is thought the general government will have to arrange to render aid to the town treasuries in providing food for a great number of the unemployed. So far, the strike has been remarkable in its lack of violence, but it is believed that the point has now been reached where it will be difficult to hold the unemployed and suffering workers in order.

German and French Strikes Ended

Following a conference of the miners' leaders in Bochum, Mar. 19, the coal strike in Germany has come to an end. From last reports, men were returning to work in the Westphalian district at the rate of 15,000 to 20,000 a day. This strike had involved nearly 300,000 men in Westphalia, Saxony, and Lower Silesia, and was marked by disturbances of such a violent nature that troops had to be sent to the mining districts.

The strike of miners in the vicinity of Denain, France, was of short duration; the movement was in direct opposition to the wishes and councils of the miners' federation, and while it was feared for a time that it would spread to considerable proportions, it was settled without difficulty, the men returning to work, Mar. 25.

It is reported that 36,000 coal miners of Austria have demanded a 15 per cent. increase in wages, and, failing to receive this concession, have threatened to strike.

British Coal Trade Crisis

(Continued from last week)

March 8—Conferences with the committee of the Cabinet resumed. Prime Minister issued an invitation to both sides to meet at the foreign office.

March 11—The miners' conference decided that the executive of the Federation should meet in joint conference either the whole of the coal owners of Great Britain or any of the districts which are prepared to concede the principal of a minimum wage.

March 12—The coal owners agreed to accept the Prime Minister's invitation to a joint conference with the miners for a discussion of the dispute, the representatives from Scotland and South Wales doing so "without prejudice."

March 13—The miners' conference passed a resolution in which they explained they were "willing to enter into negotiations at once with the coal owners in the various districts for the purpose of securing a settlement of all points in dispute at the earliest possible moment."

March 14—Further resolutions, passed by the men's representatives, in which they "agree to the proposal of the Prime Minister that some neutral person might tend to help guide the discussion along such lines as would facilitate an agreement." This with other resolutions relieved the position of the men who, having thus conceded the arbitration point, now virtually fell into line with the suggestions made a fortnight earlier by the government.

March 15—The fourth day's sitting of the joint conference of coal owners and miners and government representatives ended disastrously, in so far that all negotiations were broken off. The Prime Minister announced that the government had done all in its power to arrive at a settlement by agreement, and that they had come to the conclusion that such was impossible. Further measures must therefore be taken and the government would ask from Parliament a legislative declaration that a reasonable minimum wage, accompanied by adequate safeguards for the protection of the employer, should be a statutory term of the contract of employment of people who are engaged underground in coal mining. Mr. Asquith indicated that the district minimum should be locally fixed by a joint board in each district consisting of representatives of employers and employees, with a neutral and independent chairman who might be selected by the parties themselves, or if necessary, by the government. In the opinion of the government such a body would afford what they have regarded as all-important — the means of securing finality.

Byproduct Coke Ovens

A list of byproduct coke ovens in the United States has several times been asked for. The following (Circular No. 97, U. S. Dept. of Agriculture) gives the list as of Jan. 1, 1910:

SEMET-SOLVAY OVENS—Solvay Process Co., Syracuse, N. Y.; Semet-Solvay Co., Pennsylvania Steel Co., Steelton, Penn., also Lebanon, Penn.; Semet-Solvay Co., National Tube Co., Benwood, W. Va.; Semet-Solvay Co., Milwaukee Coke & Gas Co., Milwaukee, Wis.; Semet-Solvay Co., Detroit, Mich., also Ensley, Ala.; By-Products Coke Corporation, South Chicago, Ill.; Semet-Solvay Co., Empire Coke Co., Geneva, N. Y.; Semet-Solvay Co., Dunbar Furnace Co., Dunbar, Penn.; Semet-Solvay Co., Central Iron & Coke Co., Tuscaloosa, Ala.; Philadelphia Suburban Gas & Electric Co., Chester, Penn.

OTTO-HOFFMANN OVENS—New England Gas & Coke Co., Everett, Mass.; Lackawanna Steel Co., Lebanon, Penn.; Dominion Tar & Chemical Co., Sydney, Nova Scotia; Hamilton-Otto Coke Co., Hamilton, Ohio. The following use both the Otto-Hoffmann and United Otto: Camden Coke Co., Camden, N. J.; Cambria Steel Co., Johnstown, Penn.

UNITED OTTO—Carnegie Steel Co., South Sharon, Penn.; Maryland Steel Co., Sparrows Point, Md.; Citizens Gas Co., Indianapolis, Ind.; Pittsburgh Gas & Coke Co., United Coke & Gas Co., Glassport, Penn.; Zenith Furnace Co., Duluth, Minn. The Lackawanna Steel Co. at its Buffalo, N. Y., plant uses both the United Otto and the Rothberg ovens.

KOPPERS—Illinois Steel Co., Joliet, Ill., and Indiana Steel Co., Gary, Ind.

Miner's Night at Pottsville, Y. M. C. A.

Over 800 miners spent Saturday night Mar. 16, as the guests of the Pottsville Y. M. C. A. There were superintendents and managers; foremen and laborers; breaker boys and helpers of every kind; men of all nationalities and degrees of learning.

The special attractions of the evening were the games in the gymnasium. These were witnessed by an audience that taxed every part of the large room.

The opening number was a series of games of volley ball between the business men and senior class men from the association. The second attraction was a game of basket ball between teams picked from the best men in the Association league. The last game had great interest for the visitors, as it was played by men from the collieries. It was a game of indoor base ball, one side captained by Potts, with men from Supt. Kaercher's district; and the other side captained by Mader, with men from Supt. Hadesty's district. It was a fast game and the men, although new to it, showed great proficiency. Potts' team won by a score of 15 to 9.

The Problem of Mine Timbering

By R. B. Woodworth*

The use of steel in the mines is discussed with regard to the proper commercial forms for certain classes of work, general methods of design and the cost of manufacture and installation. This is the fourth of a series of articles on mine timbering.

*Engineer with the Carnegie Steel Co., Pittsburg, Penn.

Note—Paper read before the Kentucky Mining Institute, Lexington, Ky., Dec. 11, 1911.

From a theoretical point of view, structural steel is the best all around material for use in mine timbering. However, the steel mills roll this material in a mulptiplicity of shapes and experience has to tell us which shapes may be used most economically, as well as whether or not the use of these shapes has solved the timbering problem to the satisfaction of the principles of scientific management.

For obvious reasons, rails were the first form of steel to be used in the mines for roof supports; and they were so used in the mines of Commentry, France, as far back as 1878. They have often been used in the mines of this country as plain bars; and I have seen them fabricated into gangway supports in the Chapin mine of the Oliver Iron Mining Co., at Iron Mountain, Mich. They have been used also as stuttles between the steel ring sets of rectagular shafts in the iron-mining districts of Minnesota and Michigan. Rails are of small depth and consequent low efficency pound for pound of material used. Owing to high carbon content, they also break easily. In the Commentry Mines they were displaced by rectangular iron bars 3.15 in. deep by 1.18 in. thick and 12 ft. long. These had the requisite vertical strength, were easily straightened, and in 1889 some of them had been re-used 200 times. Bars, however, are weak transversely and fail by sidewise deflection under compressive stress in the top fibers long before the real strength of the material is fully developed.

Long experience indicates that where cross bending stresses have to be resisted, as in roof supports or in the collar of the three-piece gangway set, no form of section is more economical than the standard I-beam, which combines a high degree of resistance to bending and sufficient resistance to lateral deflection, with a minimum weight of metal. The I-beam is not, however, the best section to use for props, the legs of gangway supports, buntons and compartment dividers in shaft framing, wall plates in rectangular shaft sets or for any member that has to take pure compression or combined compression and cross bending, because the beams least radius of gyration is low and there is here required a shape that is equally strong about both axes of symmetry.

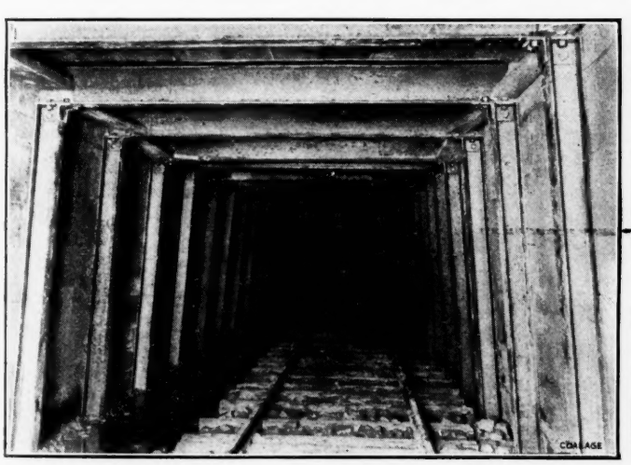
Hollow tubes possess the quality of equal strength in all directions in a theoretically ideal manner but suffer from the disadvantages of their relatively high cost of manufacture and the practical difficulties attendant upon fabrication. While hollow tubes, therefore, may economically be used for props, as they have been, especially in the collapsible form, they are not adapted to the other more varied uses in frames.

Properties of the H Section

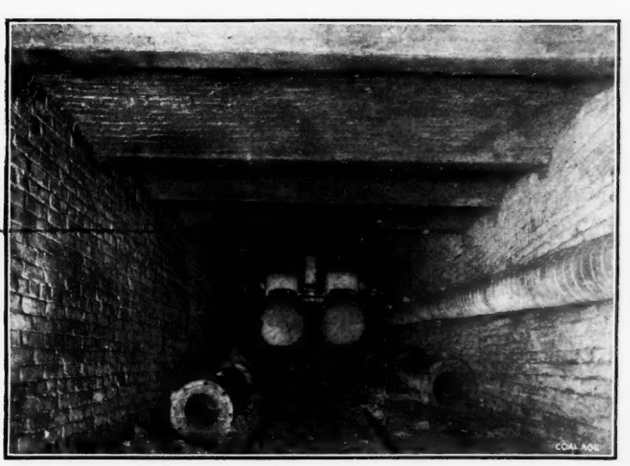
The ideal section of sufficient strength for most mine-timber framing conditions is the H-beam. This form of rolled shape possesses a large radius of gyration and, in comparison with its weight, the most economical distribution of material to resist pure compression or combined stresses. A distinct advance in the use of metal for mine timbering in England, was inaugurated by the rolling of an H section in 1885 by the Darlington Iron and Steel Co. A like impetus to the use of steel in the mines of the United States was given in 1907 when, after careful investigation of the mine timber situation, the Carnegie Steel Co. began to roll 4, 5, 6 and 8 in. H-beams with especial reference to the needs of the mines.

As early as April 7th, 1894, the Carnegie Company had called attention to the theoretical economic advantages that would follow the application of steel to mine timbering. The timber situation, however, was not then so critical as now and neither had it been shown that the use of wood in many cases entails large economic wastes. The favor with which these sections have since been received and the success which has attended their use has demonstrated their peculiar fitness for this work. Industrial progress often waits upon the proper solution of its problems and the exact satisfaction of its fundamental needs.

The H-beam is, therefore, the proper shape to use for the legs of the three-piece gangway supports, the wall plates of rectangular shaft sets, for buntons in all types of shaft framing, whether circular, elliptical or rectangular, for



Interior View of Mine, Moshannon Coal Co., Oceola Mills, Penn.



Steel Roof Supports and Brick Arches, Leggitt's Creek Colliery, Scranton, Penn.

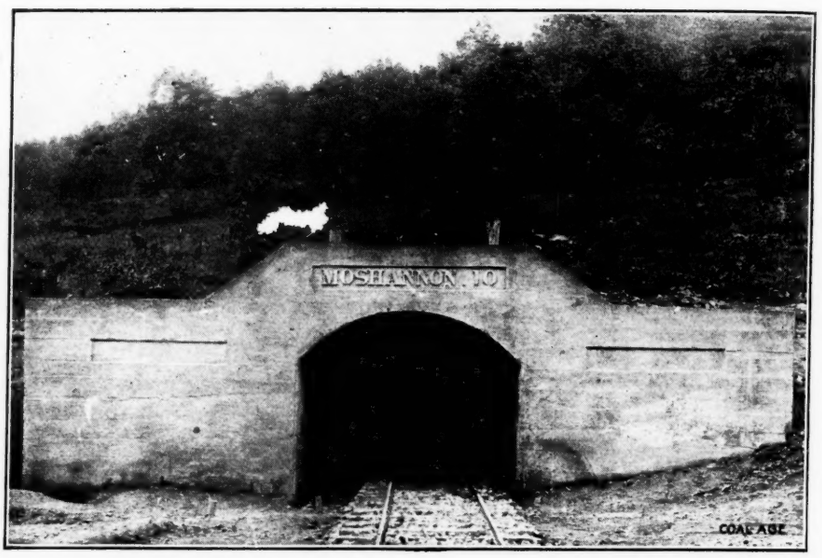
mine props and for mud sills under gangway supports in swelling ground. It has also been used for cage guides both with and without cast steel safety racks. In rectangular shaft framing its broad bearing surfaces render wedging simple and secure.

The rolled steel angle makes an ideal stuttle, calculated to take either tension or compression—tension when the framing hangs from the bearers above, compression when the weight of the framing is carried to the bearers below. Its use obviates the need of hanging rods during the process of sinking. The angle also makes an efficient leg in a gangway support when the loads are light, or if desired, the rolled steel tee may be used for this purpose.

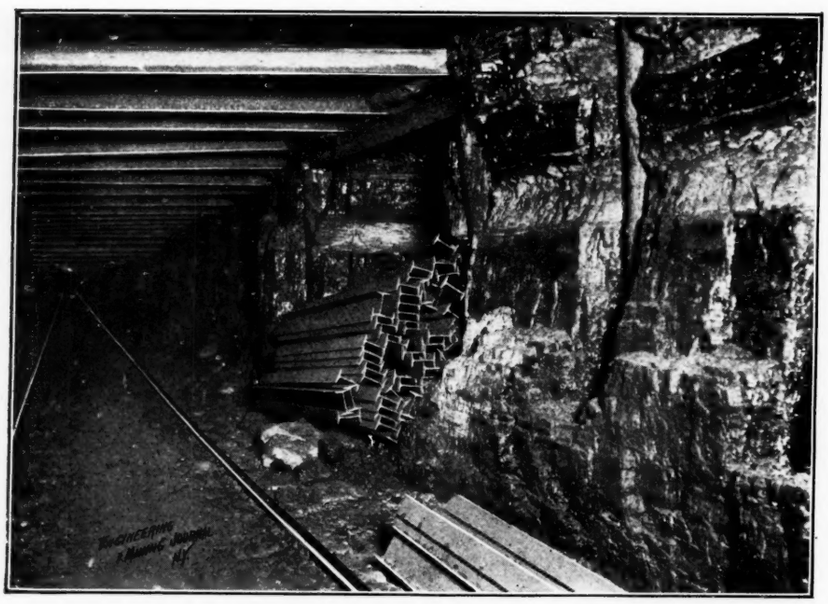
Lagging if of metal, may be made of boiler plate (used in England as far back as 1886) corrugated sheets or, where extreme strength is needed, of buckle plates. The thin concrete slab, however, may well be used where acid water is present, either plain, or reinforced with expanded metal, wire mesh, or rods.

In repairing the rectangular shaft at the Mt. Lookout colliery of the Temple Iron Co. near Wilkes-Barre, Penn. in 1907, a steel lining was carried 50 ft. to rock, and made of 12 in. steel channels placed edge to edge. A similar lining was used in 1894 between two levels at the Grimsby Iron Ore Mine in the Siegen District, Prussia. Such a lining is not beyond right reason even in circular or elliptical shafts. In fact, circular steel segments, exact duplicates of the cast iron circular segments, were installed in an experimental way in one of the tunnels of the Hudson and Manhattan Railway, Jersey City, N. J., in 1909. Structurally the subaqueous tunnel and the circular shaft are identical and there is no economic reason why English or German tubbing should not be replaced by circular steel segments made of channels or built up of boiler plate webs and angle iron ribs, the thickness of the webs and ribs increasing with the depth of the shaft if necessary.

If boiler plate may be economically used in a tank many feet high to keep water in, it may, on a parity of reasoning, be used in a shaft many feet deep to keep water out, the stresses being the same and their effects on the lining alike. Indeed, at the Detroit River Tunnel of the Lake Shore and Michigan Southern Ry., completed in 1910, the shore approaches were made of circular cast iron segments while the portion under the river was made of twin riveted boiler plate tubes.



CONCRETE MINE PORTAL, OCEOLA MILLS, PENN.



STEEL BEAMS, BOGGS MINE, BARTON, OHIO

COST OF FABRICATION

Steel beams for roof supports may be used just as they come, cut to length, from the rolling mill; all the other types of mine timbering need to be fabricated, that is, framed and fitted, before they are ready for use in the mines. A most important consideration is to reduce the cost of this fabrication to the lowest possible amount by simplification of the details. Blacksmith work always should

TABLE 1. STEEL GANGWAY SUPPORTS FOR A DOUBLE TRACK GANGWAY

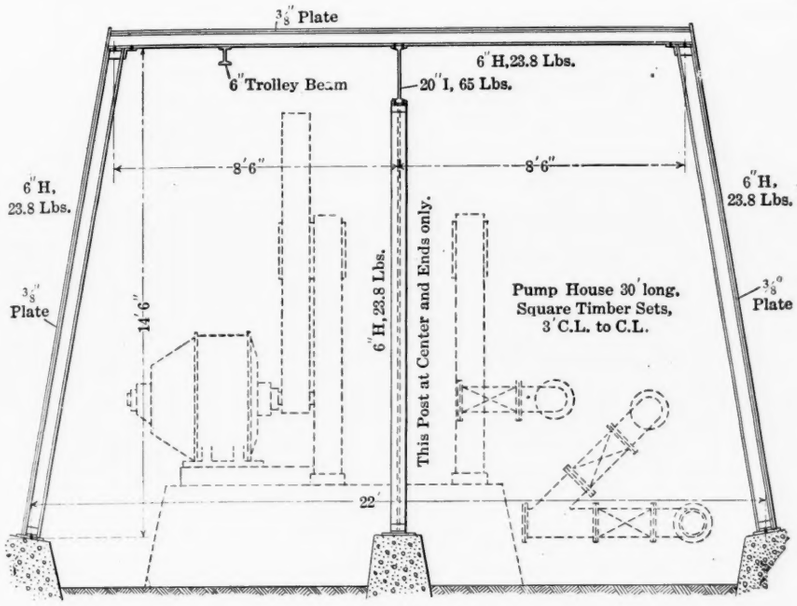
Collar 17 ft. long between legs; legs 10 ft. 6 in. high in the clear; equivalent in strength to 24 in. round long leaf yellow pine timbers.

Style	Size of Collar	Size of Pegs	Weight per Set Without Base, Lb.	Weight per Set With Base, Lb.	Cost per Set Without Base Dollars per Set	Cost per Set With Base Plates, Dollars per Set
B	20″ 65-lb. beam	2–7″ C.—14.75 lb.	1930	2030	36.82	39.48
D	20″ 65-lb. beam	2–7″ C.—14.75 lb.	1930	2100	36.82	43.95
C	20″ 65-lb. beam	1–8″ H.—34.6 lb.	1710	1800	25.39	27.80
A	20″ 65-lb. beam	2–7″ C.—14.75 lb.	1930	2500	36.82	58.50
F	20″ 65-lb. beam	1–8″ H.—34.6 lb.	1690	1730	25.81	26.88
I	20″ 65-lb. beam	1–8″ H.—34.6 lb.	1730	1780	25.22	27.12
E	20″ 65-lb. beam	2–7″ C.—14.75 lb.	1670	1770	25.94	28.60
G	20″ 65-lb. beam	1–8″ H.—34.6 lb.	1690	1730	25.81	26.88

be avoided; and that form of framing is the cheapest in which the fitting shop work is the simplest. Intelligent skill in structural design here means great saving.

In my investigations, eight different types of framing for steel gangway supports have come into serious consideration. With plain material at 1.25c. per pound f.o.b. cars Pittsburgh, and the usual extras for workmanship, the comparative costs of these styles are shown in tables 1 and 2, from which can be seen at a glance how great a part attention to details may play in the economic use of materials and the avoidance of unnecessary work in fabrication. The eight sets of each table are all of equivalent theoretical strength.

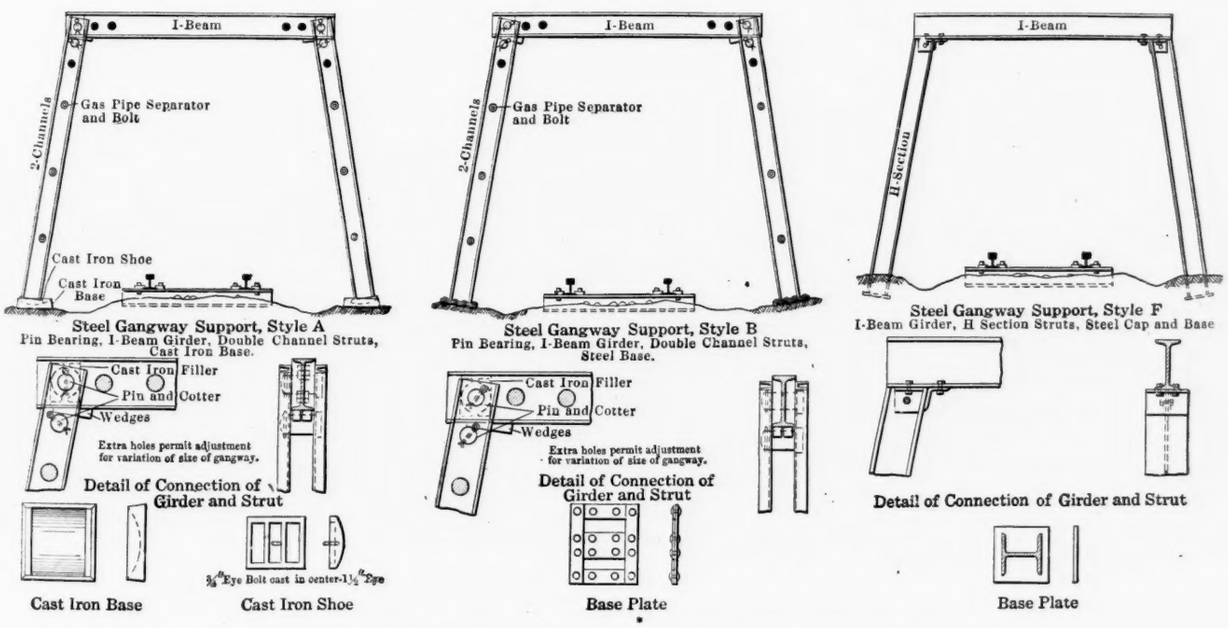
The figures in these two tables do not include painting. The cost for this varies considerably with the kind of paint used but may be estimated at $2.00 per ton.



FRAMING OF STEEL TIMBER SETS FOR PUMP ROOM

Electric Lamps in Mines

The Philadelphia & Reading Coal and Iron Company leads in the use of electric mine lights. Over 500 miners in their employ are now using this type of lamp. The lamp in question, a two-volt, three candlepower construction, will burn 12 hours. It weighs only two pounds and is easily worn under mine conditions. A reflector throws the light forward, giving a good view of haulageways, roofs, chambers and the coal to be mined. By their use, difficult work, such as that required in narrow and poorly ventilated breasts, which formerly took two weeks, can now be done in three days, as the miners are free from the evil odors of open-flame lights burning in a narrow space, and in addition they have a steady, bright light to work by. The rules of the Reading company demand the use of electric lights around all breakers, mine stables or other buildings, where a spark from an open light might cause a fire.


I-Beam
2-Channels
Gas Pipe Separator and Bolt
Cast Iron Shoe
Cast Iron Base
Steel Gangway Support, Style A
Pin Bearing, I-Beam Girder, Double Channel Struts, Cast Iron Base.
Cast Iron Filler
Pin and Cotter
Wedges
Extra holes permit adjustment for variation of size of gangway.
Detail of Connection of Girder and Strut
3/4" Eye Bolt cast in center-1 1/2" Eye
Cast Iron Base
Cast Iron Shoe
I-Beam
2-Channels
Gas Pipe Separator and Bolt
Steel Gangway Support, Style B
Pin Bearing, I-Beam Girder, Double Channel Struts, Steel Base.
Cast Iron Filler
Pin and Cotter
Wedges
Extra holes permit adjustment for variation of size of gangway.
Detail of Connection of Girder and Strut
Base Plate
I-Beam
H-Section
Steel Gangway Support, Style F
I-Beam Girder, H Section Struts, Steel Cap and Base
Detail of Connection of Girder and Strut
Base Plate

VARIOUS METHODS OF FRAMING AND INSTALLING STEEL GANGWAY SUPPORTS

TABLE 2. STEEL GANGWAY SUPPORTS FOR A SINGLE TRACK GANGWAY

Collar 10 ft. long between legs; legs 8 ft. high in the clear; equivalent in strength to 15 in. round long leaf yellow pine timbers.

Style	Size of Collar	Size of Legs	Weight per Set Without Base, Lb.	Weight per Set With Base, Lb.	Cost per Set Without Base Dollars, per Set	Cost per Set With Base Plates, Dollars, per Set
A	10" 25-lb. beam	2–6" C.—10.5 lb.	765	945	14.81	23.17
D	10" 25-lb. beam	2–6" C.—10.5 lb.	765	800	14.81	15.85
B	10" 25-lb. beam	2–6" C.—10.5 lb.	765	810	14.81	16.12
E	10" 25-lb. beam	2–6" C.—10.5 lb.	605	660	9.39	10.87
C	10" 25-lb. beam	1–5" H.—18.7 lb.	569	590	8.84	9.43
F	10" 25-lb. beam	1–5" H.—18.7 lb.	566	587	8.80	9.39
G	10" 25-lb. beam	1–5" H.—18.7 lb.	565	605	7.91	9.04
I	10" 25-lb. beam	1–5" H.—18.7 lb.	600	630	9.80	11.11

Explosion at Sans Bois Mine No. 2

The Sans Bois mine at Chant, Oklahoma, was the seat of a severe explosion on March 20 in which 80 men were killed and 25 were rescued or escaped. Fourteen men saved themselves by breathing the air escaping from a compressed-air pump. Gas was probably the main factor in the explosion.

The Sans Bois mine No. 2 is situated at Chant, Haskell County, Okla., about 37 miles from Fort Smith, Ark., this latter city being quite close to the state line. The village of Chant is reached by the Fort Smith & Western R.R., and has a population of about 1200 inhabitants.

Use of Explosives

Though the largest of the three mines belonging to the Sans Bois Coal Co., it is not a big producer. In the fiscal year between July 1, 1909, and June 30, 1910, the output of the mine was 70,195 tons. Ninety-five miners were employed, with 57 other inside men. Adding thereto 22 men who were employed on the outside, the total force ran up to 174 men. Two significant figures are given for that year's operation; 6260 lb. of dynamite and 1045 kegs of powder were used in blasting. The proportion of slack, as might be expected, was also abnormally high. Out of 70,195 tons shipped, 35,603 tons were of pea and slack sizes. Disregarding the large amount of dynamite mentioned, nearly 2¾ lb. of powder were used per ton of coal sent to the tipple.

Presence of Firedamp

The main entry of the mine is used as a hoisting slope and the headings are turned off directly from it to the north and south. The mine, especially on the south side, has suffered from severe squeezes. For ventilating purposes a fan is provided. The mine generates firedamp and there have been two unimportant explosions before. On Dec. 30, 1909, an explosion occurred, killing an Austrian shotfirer, and within that same week, another shotfirer, this time an Italian, was killed. It was stated by the inspector that the mine was very dry and dusty after these explosions, and instructions were left that the accumulations of dust should be loaded out and the rooms and entries sprinkled before resuming operations. Both the little explosions referred to were alleged to have originated from blown-out shots.

It is customary to sprinkle the headings and it appears that water pipes were laid for that purpose. Yet, in the year before the explosions just referred to, one complaint was made of the need for sprinkling. To mining men in other states, not so strict as Oklahoma in this matter, it might be interesting to call attention to recommendations made in May, 1909, to the effect that the company was employing more than 45 men in one air current. The company was urged to build a new overcast, that the danger resulting from having so many men in one split might be reduced.

The Explosion

The explosion occurred on Mar. 20, at 9:05 a.m., probably in the entry known as the Ninth level. About 105 men were then underground. Eleven of these escaped by a manway, located about 200 yd. from the entrance. Of these, nine, who were working in the South Fifth level, did not hear the report, but the dense smoke which soon reached them gave them warning that an explosion had occurred. They immediately made their way out. One man, who later staggered to the drift mouth unaided, was walking in an entry when the explosion took place. Hearing the sound, he leapt into a disused room, and the fiery blast passed by him. Another man, a "rope rider," was on a trip of cars when the explosion occurred. Fortunately, that trip was leaving the mine, and the man came safely to the surface.

The Rescued

The work of rescuing began at once and a boy named John Golívas was the first one to be brought out. It was thought at that time that everyone still

The Tipple and Drift Mouth Sans Bois Mine No. 2 at Chant, Okla.

remaining in the mine was dead, so complete was the demolition of the mine workings. But about noon of the following day, 25 hours after the explosion occurred, tappings were heard on a pipe line. Fourteen men were found huddled in a little pump hole, measuring 8x10 ft. They had been thoughtful enough to gather around a water pump, which was driven by air, the flow of which had not been cut off by the explosion. To shield themselves from the foul air of the entries, they had hung a curtain over the mouth of the pump hole. They removed the valve covers from the top of the pump and were piled over one another in the endeavor to breathe in as much as possible of its life-saving air. As one man after another grew faint, his fellows held him over the top of the pump until he was revived by the fresh air driven into the mine by the compressor.

Eighty Men Are Killed

The fourteen men rescued, together with the eleven men who escaped, make up the quota of men who returned alive from Wednesday's work in mine No. 2. Eighty men are believed to have perished, and 69 bodies have already been taken out. However, one of the 14 rescued from the pump room, a boy of 16 years of age, who was of the surveying corps of W. D. Roper, died after reaching the surface. At first he was partially insensible. His senses returned and he related his experiences, but suddenly a pallor spread over his face and before he could be seized he fell heavily to the ground. The shock had been too severe for him to withstand.

John Kokoski and Frank Scott were the first men who reached the pump hole, and at first they fought for the air. But

Side View of the Sans Bois Tipple No. 2 Mine

The Waiting Crowd at the Drift Mouth

To add to the difficulties of the terrible situation, the water rose in the pump hole and lay, it is said, 6 in. deep all over the floor. It is possible that the presence of the water in this part of the mine reduced the destructive action of the explosion and served later by its absorptive qualities to purify the foul air.

Despite his precarious condition and the certain perils to which exploration would expose him, one man made two unsuccessful trips to try and rescue his brother, each time dragging back a lifeless man. He was so overcome by his exertions in the foul air that when he was rescued he, with three others, had to be carried out.

gradually more noble impulses prevailed and they left their place of security to hunt for other men, that they might give up to them a part of that air which might well have proved insufficient for themselves.

Among those killed was W. D. Roper, a surveyor, of Cleo, N. C., formerly a professor in a Georgia military academy and much respected in that section. The men killed were of various nationalities, American, Austrian and Italian. The chief inspector, E. Boyle, it is said, declared that the explosion resulted from gas, and that dust did not do much to augment its force and also that insufficient care was taken to prevent an explosion.

Water-Tight Shaft Lining

An English method obtaining practically dry shafts consists in using cast-iron tubbing, the insertion of which forms a water-tight lining through the water-bearing strata. This holds back the feeders of water and provides against permanent pumping.

The tubbing consists of segments, cast to suit the circumference of the shaft and the pressure to which it is to be subjected. Usually 8 to 12 segments 4 ft. long and 18 to 36 in. deep are used. The smooth face of the segments forms the outside of the shaft and their inside face is strengthened with ribs or flanges. Each segment has at least one hole to allow the water and air to escape from behind while it is being driven into position. The thickness of such tubbing depends upon the diameter of the shaft and the vertical head; the head is usually reckoned as being equal to the depth of the shaft.

When tubbing is to be used, the shaft is put down until a good foundation is reached. Then a curb bed is prepared by hand; no blasting is done as it might disturb the bed and render it useless. After the curb bed has been carefully tested with a spirit level, a thin layer of tarred sheeting or tarred flannel is spread over it to act as a cushion between the curb and rock; the curb is then laid and fitted together with deal-sheeting between each point.

Wedges of dry yellow pine, with the grain vertical, are then driven down behind the curb until the space between the rock and the curb is filled. Harder, and thinner, oak wedges are then driven into all crevices in the pack until it is impossible to drive more; steel wedges are then driven into the pack, and in the spaces thus created, more hard-wood wedges are driven.

It is absolutely necessary that the curb be exactly level and that the exact center of the curb and shaft coincide. After the curbing is set and wedged into position, layers of elm, fir or deal-sheeting are placed on top and the segments of tubbing lowered and wedged into position. Any space between the shaft and the tubbing is filled with concrete for the first few rings, puddled clay being used for the remainder.

After one ring of tubbing has been wedged up, a layer of sheeting is placed on the top flange and the next ring laid. The vertical joints are wedged first, beginning at the bottom and working up, and the horizontal joints wedged last. When the wedging is finished, the hole made in each segment for the escape of air and water is stopped with a wooden plug driven in tight. A relief valve is located in the top ring of the tubbing to allow the air to escape so that the plates will not be forced out of position.

Who's Who—in Coal Mining

Devoted to Brief Sketches of Prominent Men, Their Work and Ideas

Few men in the coal industry of this country have advanced to a position of high responsibility with such rapidity as has Carl Scholz. Born in Germany 40 years ago, his early education was obtained in the private schools of the Duke of Hohenlohe, at Slaventzitz, where he spent six years.

This early education was succeeded by two years of training under Professor Schmiedcke in the upper Silesian Mining School at Tarnowitz; following this, Mr. Scholz worked two years at the mines, partly as a practical miner, and the remainder of the time in the laboratories and offices, always under the direction of the mining school.

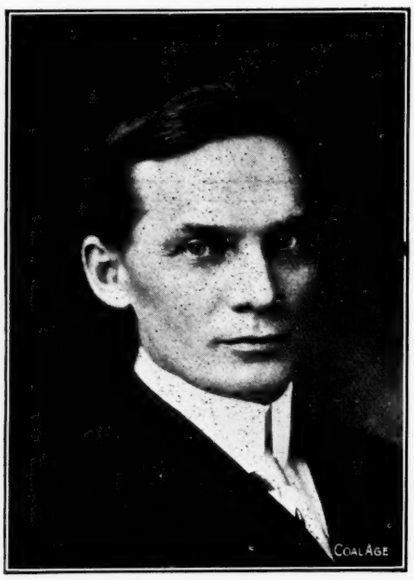
Perhaps it was his German training, administered with military precision, or probably the cause is an inherited racial characteristic, but the fact remains that Carl Scholz is 110 per cent. efficient in the matter of observing details. If each man possesses some special ability that is a key to the door of success, then a keenness for small essentials is the pass that slipped the lock for Carl.

There's any number of systems for accounting costs of mining, but few coal companies have skeleton forms superior to those adopted by Mr. Scholz. And right here let me say that his policy is to spend more than the average amount of money on the preparation of fortnightly operation charge sheets, and economize, if necessary, on some less important work. Each superintendent, therefore, is always informed where leaks exist and where attention is needed.

When Carl Scholz first came to this country, he secured employment as assistant mining engineer with the Mount Carbon Company at Powellton, W. Va. Subsequently, a partnership was formed between Mr. Scholz and James R. Thomas, the latter well known at Charleston, W. Va. Together they opened up a number of mines, being among the first to sink shafts in certain parts of the splint- and gas-coal districts of that state.

Several of these properties were afterward sold by Messrs. Thomas and Scholz to the Sunday Creek Coal Co., and in 1902, some of the men connected with the Rock Island railroad, persuaded Mr. Scholz to take up the management of its coal properties located in Oklahoma.

Gradually he became the executive in charge of all its different mining interests, until, at the present time, he is president of the Rock Island Coal Mining Company and of the Coal Valley



CARL SCHOLZ

Mining Company; vice-president of the Consolidated Indiana Coal Company and manager of the Mining Bureau of the Chicago, Rock Island & Pacific Railroad.

In recent years, Carl Scholz has supplied the U. S. Geological Survey valuable information on the geology of the various sections of the country in which he is actively interested. His work as a mining engineer and scientist was well recognized by the government in 1910, when he visited the British Isles, France, Belgium and Germany, under the auspices of the Federal Bureau of Mines.

As consulting engineer for that department, his investigations were chiefly confined to a practical and scientific analysis of the foreign laws governing the operation of coal mines. Attention was paid to discipline in the mines, prevention of accidents and waste in mining, employer's liability and the German selling syndicates.

One of the hobbies of "C. S." is his advocacy of better regulated methods for selling the fuel production of our collieries. He applauds the German Syndicate system which handles the bulk of that country's output without subjecting the product to the losses and waste incurred through suicidal competition, such as has existed in our own bituminous industry. He says the German method has placed the coal industry in that country on a basis that enables the operators to mine at a reasonable profit, in consequence of which they are able to pay their employees a fair wage and to furnish better protection against injury. The coal consumer benefits through the elimination of fluctuations in price. The large user does not secure a low price at the expense of the small buyer.

When it comes to technical problems that have a direct bearing on present coal practice, our friend Carl looms brightly as a man of fixed and original ideas.

In answer to the question as to whether or not we should reverse a fan in time of distress, Carl says, "*No Never*—Not only do not reverse them, but don't even make them so they can be reversed." He would like somebody to tell him when a fan was ever reversed with beneficial results. Says he can point out dozens of instances where lives were unnecessarily sacrificed by such a maneuver. Declares that miners become creatures of habit; that they soon learn the return and intake airways, and in time of danger instinctively rush toward fresh air.

He further states that no plan is possible whereby men imprisoned underground can be notified that the system of ventilation has been changed. Says if any action at all is necessary, the fan can be stopped and this will accomplish all that is needed. In support of such opinions, Mr. Scholz is now installing only non-reversible fans, cutting his fan installation cost practically in half and in addition removing what he considers a useless danger.

In opening an immense field in Iowa, "Carl S." is putting into effect a number of ideas that are ultra-modern as coal practice in this country goes. The chief point of interest, perhaps, is his plan for using only electric hoists. He figures that the present type of steam-hoisting engine will consume on an average from 100 to 125 lb. of steam per effective horsepower; his plan for an electric hoist driven by condensing engines and including conversion losses, entails the use of only 25 lb. or steam. Thus only about 20 per cent. as much fuel is required.

As to first cost, he says the electric hoist will figure two or three times as much, but if electricity is needed for other purposes and a central power station is built, the saving that will result almost immediately will reimburse for the higher initial expenditure. He states the advantages of electric hoisting as, better control, greater safety, economy in steam consumption, lower maintenance charges and reduction in space required.

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This journal has a direct aim—a single purpose—which is to help advance the coal-mining industry. Its creed embodies the dissemination of knowledge and the free interchange of ideas among its readers, all of whom are invited to become regular contributors.

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COAL AGE

The Labor Situation

There has been no change in the anthracite-coal controversy, and up to the present time the bituminous operators and labor leaders who are in conference in Cleveland have not reached an agreement. The chief development of the past few days is the weak and faltering policy of the bituminous operators. At the commencement of the present negotiations, the soft-coal mine owners had an excellent case, and there was every reason to anticipate that a favorable compromise would be reached with the union miners. Whether it is leadership or what not, the bituminous operators have receded from their position a half dozen times in less than that number of days.

In direct contrast to the action of the soft-coal men was the conduct of the anthracite operators in their meeting with the miners' leaders. There was no irresolution or unsteadiness of purpose when the hard-coal people met Mr. White and his lieutenants in New York. The miners did not smile and leave town filled with the idea that they controlled the outcome of the situation. They know now that whatever concessions they win in the anthracite field will come after a struggle that will test both their strength and the merits of their demands.

At Cleveland, the representatives of the bituminous mine owners started by first conceding the elimination of their demand for a 10 per cent. reduction in wages. Other backdowns followed in rapid succession and this action as a whole was supplemented by dissension within their own ranks. It is probable that Illinois as usual will be the goat when an agreement is reached.

It almost seems as though the hands of fate were busy shaping the course of events to suit the wishes of the mine workers. The latter started with slight prospect of forcing their demands to a successful conclusion. All economic conditions were against them; their finances were low, 90 per cent. of the hard-coal workers opposed the strike and 75 per cent. of the miners in the bituminous fields were adverse to a shutdown. A strong bluff constituted about all the artillery the miners possessed. It now appears the soft-coal operators did not have even that strong a hand to play.

The railroads of the country consume a lot of coal, and the bituminous operators, because of their strenuous efforts to obtain rate reductions, are not on any too friendly terms with the soft-coal carrying roads. Probably these same operators realize that the railroads will seriously oppose any advance in the price of the coal they purchase at the present time, when they have just been compelled to concede material reductions in their carrying charges. If the operators can have it appear that any advance they give has been forced by the miners, aided in their fight by public opinion, then, so the coal owners figure, a better face will be put on the entire matter and consumers will be more likely to stand for a raise in the price of coal.

The situation in the anthracite field, however, does not promise so well for the miners' side of the controversy. And it is in this district particularly that the union wants to strengthen its position. The only recognition given them by the hard-coal operators is comprised entirely in the action of the conciliation board, which commission was created to settle disputes between the employers and the men. There is absolutely no hope of the union leaders securing any further recognition here, whether it is in the form of a "check-off" system or any other principle that would bring about the same result.

The situation, therefore, with the exception of the change in the front of the soft-coal owners, remains practically the same as when the negotiations first started. The outlook is for a settlement in the bituminous states, perhaps after a short suspension, with possibly a slight advance in wages (probably 5c. per ton) awarded the miners. In the anthracite field the chances are for a suspension, the outcome of which it is difficult to prophesy.

There is little doubt but that the hard-coal owners will try to break the strike shortly after a suspension occurs. The employers know of the feeling that exists among the miners and they will take advantage of this desire on the part of their employees to remain at work. The operators can point to the prosperity that has resulted in northeastern Pennsylvania from a cessation of serious labor disputes. The men themselves realize better than anybody else that they are not the overworked, underpaid class of employees that some writers would have us believe.

It is therefore quite probable the miners will lose in their struggle and it is possible the suspension will not be as long extended as many of us at first believed. The threatened danger, however, may not end with the demolition of the United Mine Workers of America in the anthracite industry. There is another great industrial organization of workers that is planning and would be greatly pleased to see the union of the mine employees destroyed. The federation I refer to is closely allied, in fact it is really a part of a certain political party, and if the campaign as outlined by the labor leaders who are opposed to the present mine workers' organization, can be carried to a successful conclusion, a second strike fostered and financed by a body of men who have just come out of a winning fight in another industry, will be precipitated several weeks prior to the November elections, and before a normal supply of coal can be restored.

The chief difficulty to the consummation of any such comprehensive plan will be found in the attitude of the more intelligent class of miners working in the northern anthracite field. These men, mostly Welsh and generally of a high order of intelligence and efficiency, are already supporters of the old political parties and are not so easily led by radical socialistic propaganda.

Without in any way attempting to assume the position of an alarmist, we do believe the situation bears watching, and it is likely the outcome may differ a little from what many of us anticipate. There is an undercurrent of thought prevalent today wherever men work with their hands, and history has shown that oftentimes a monster structure has arisen from the ruins of some smaller and less imposing edifice. It is a question whether the miners' union should be destroyed even if such a result can be effected.

The Technical Graduate

Gradually the technical graduate is working his way toward the reconstruction of the mining industry. Years ago, when the so called practical man filled every important official position, any devices requiring technical training for installation or operating were ruthlessly denounced. They had been built, installed, operated and supervised by the inexpert and had naturally been found grievously wanting. Today developments in every line have made the graduate indispensable. His future as director of the industry is no longer in doubt.

Unfortunately, there is some good ground for abuse of the graduate, viewed as that raw product emerges from the mill. We do not refer to his overweening confidence, his arrogance, his inability to learn from the evidences of his eyes, his proneness to discount all wisdom save that proclaimed from cap and gown, his lack of the mellowing influences of experience, or even to his contemptuous attitude to all things mundane after a long sojourn in marble halls. These are personal faults, not subject to academic correction, but there is a more belittling fault than all of these.

The difficulty with the boy graduate arises from the failure of the average professor to score and underscore the primary essentials of academic teaching. Before the graduate has been one day on the job, he has discovered that some fact, known to every rodman or engine hostler, has evaded him. He has been taught all he needs to know about it, more, perhaps, than he will ever need to know, but this essential fact has been overlooked. All his teaching has been in double-leaded type, and he has been expected without experience to separate the essential from that which is merely valuable. He has felt that he could not carry the whole mass of information so prodigally bestowed on him, and he has chosen blindly that which his brain cells have most readiiy accommodated. He finds too late that his choice uncontrolled was grievously ill advised.

The graduate is thus rebuffed and put at a disadvantage at the very threshold of his career. His solution of equations of higher degree, his calculus and his stress analyses are above his critics, but this one thing, this one essential, is not possessed, and all his college training is condemned.

We think the college faculties could rectify this matter by making careful inquiry of the students as to the lack of knowledge which first confounded them. Why not ask some man of broad knowledge just what a young man should know before all else, to make a good appearance when he enters the practical life? And having such knowledge, the students in the senior year should be carefully examined and made to answer such questions unfalteringly, making absolutely no mistakes. If the student fails he can be reëxamined, coached and helped in every way so that he will enter his profession with at least the stock-in-trade of the office blueprinter, the chainman or the engine swabber.

What's In a Heading?

Even editors are occasionally imbued with feelings, and we must confess to a distinct shock to our own on reading the following head lines in the *Weekly Courier*, of Mar. 21:

U. S. MINE BUREAU HAS ITS MARTYRS

TWO TRAINED RESCUERS HAVE GIVEN UP THEIR LIVES IN ACTION

DR. HOLMES IS WELL PLEASED

We believe we know Dr. Holmes well enough to emphatically deny that he is "well pleased," and we are sure we know the *Weekly Courier* well enough to anticipate its apology.

Contrary to general belief, editorial work is no sinecure, and its "rewards" are often the reverse of rewards. As the editor sits, in modest pride, reviewing the results of his labors in a current issue, his dreams are not infrequently dispelled by the receipt of a communication to the effect that "the crosscut between rooms 61 and 62 on the 32d Butt Entry off the 12th South Entry is shown slanting in the wrong direction!"

Strange as it seems, the more extraordinary errors are the ones that most frequently get through. For instance, the Associated Press once sent out a description of a gun fight in which the principals had shot each other to death. After describing all the bloody details, the dispatch concluded with, "it is believed the men had some misunderstanding."

Discussion by Readers

Comment, Criticism and Debate upon Previous Articles, and Letters from Practical Men

The Fireboss Question

Much interest has been aroused by the discussion that has appeared in the columns of COAL AGE, relating to the work, qualifications and duties of the fireboss; and I beg to submit, in this connection, a few brief extracts from an address to firebosses and those aspiring to such position, delivered by James Home, at the semimonthly meeting of the New River Mining Institute, held at Scarboro, W. Va., Mar. 7, 1912. Mr. Home's remarks, in substance, were as follows:

In my opinion the fireboss is the chief guardian of any mine where his services are required. Some firebosses assume that their duties are merely to examine a mine for gas and note any derangement that may have taken place in the ventilation. These duties should be performed with great care, at all times. They cover, however, but a small portion of the dangerous conditions that should be detected by a keen, observant fireboss.

To reach a high standard of efficiency, the fireboss should be familiar with every circumstance occurring in the mine; and must have a thorough knowledge of all the difficulties to be encountered in the mining of coal. His judgment should be sound and he must have the courage of his own convictions. He should consult himself often concerning what action he would take in the event of a sudden outburst of gas, stoppage of the fan, choking of the airways by falls of roof or inflow of water, fire in any part of the mine, etc. Such a rehearsal of his actions beforehand is essential to make him cool headed and ready for action even if the process is only mentally performed. He would in all probability be able to employ some of the plans thus formed, when confronted with the real thing. While in the performance of his duties, he should be possessed of a feeling such as takes hold of the hunter when he enters the forest. The difference between them is, that the hunter is seized with a desire to destroy life, and in order to satisfy that desire he searches for a trace of any living thing, which he hopes to kill. The fireboss should be as deeply interested in his desire to save life and to discover any conditions that are dangerous, for the purpose of counteracting them and making the mine safe. I am sure there is as much inspiration to be found in the one as in the other.

Let us travel with the fireboss and see what are his duties. Arriving at the mine, three hours prior to the time of starting the shift, he carefully examines, fills and adjusts his safety lamp, visits the fan, makes a note of the water-gage barometer and thermometer readings, passes through the boiler and engine rooms, speaking to the fireman and engineer. If all is well, he erases the report on the bulletin board affixing the date of the present day, after which he descends into the mine. The absence of the O. K. on the board together with the instructions given the engineer and the locking of the travelingway gate will suffice to keep any unauthorized person from entering the mine until his return. He observes the condition of the shaft while slowly descending, and upon reaching the shaft bottom goes to the foot of the downcast to see if the usual volume of air is traveling in its proper course. Finding all satisfactory he proceeds into the mine, traveling with the intake air current, for the reason that should he encounter a mine fire or a large body of gas he has only to retreat a few steps to safety. Whereas were he approaching from the return side, his retreat from the danger zone would be less easily accomplished. As he advances, he examines all cavities in the roof, entrances to abandoned workings, and void places where gas would be likely to lodge and sees that all danger signals are in place. On arriving at the working face he observes the conditions there in detail, for it is here that 80 per cent. of the accidents occur. He not only examines each place for explosive gas, loose rock or coal, absence of timber or condition of the timbering, but he is observant to detect any dangerous practices on the part of miners in the manner of placing their shots, securing the roof and coal, and the general care taken of their working places. More lives have been sacrificed in coal mining through the indifference of mine officials to these last-mentioned dangers than from all other causes combined.

It may be asked how the fireboss is to detect these dangers while the miner is not actually engaged at his work. It is easy for any experienced fireboss to distinguish the difference between a prudent and careful miner's place where everything is neat and orderly, and the scene of disorder that prevails in a place worked by an ignorant or a careless miner. Holes drilled too deep, the absence of stemming material, huge lumps of coal thrown back 50 ft. from the face by the force of the blast, and the general ragged appearance of everything in the vicinity tell an unmistakable tale.

After examining each place in its turn for the dangers mentioned, and marking the date of inspection near the face, as evidence of his presence, the fireboss returns by the haulways, inspecting on his way the wiring and general condition of roof and the timbering and track. Having fenced off all unsafe places found and from which he was unable to remove the danger at the time, he ascends the shaft, makes a written report in the book kept for that purpose and marks the bulletin as it should be, O. K. or otherwise. It is the duty of the fireboss also to warn any man in whose place he has discovered any danger, and to make a verbal report to the mine foreman and stand ready to carry out that officials orders, during the remaining hours he is on duty.

One Who Has Firebossed.

Whipple, W. Va.

Normal Ventilation at Firing Time

I have read, with much interest, the letter of John Verner in the issue of Feb. 3. He draws attention to the fact that, where the workings have extended a considerable distance underground, mine explosions are less frequent than when mining is first commenced. This is an interesting conclusion, though Mr. Verner does not say emphatically that this extension of the workings is the sole cause of the reduction in the number of explosions. Yet he leads the reader to the inference that the ventilating current should be reduced in volume when shots are being fired.

The reductions in the quantity of moving air, in the cases Mr. Verner instances were not intentional but were caused by the extension of the mine workings without a corresponding increase in the volume of the air entering the mines. Of course, it is a natural consequence, that the air current is retarded when it meets with the extra friction of the lengthened airways. Nor is it less axiomatic that this will result in a slower feeding of the coal dust to the flame of an explosion. However, we should not forget that these considerations have solely to

do with the extension of the violence and have no influence on the primary ignition or explosion.

I am a strong advocate of fresh air, the more the better, within reason. Moreover, in the mines of Pennsylvania, if the fan is stopped or slowed down, the legal quantity of air will not be circulating. The law also requires the continuous operation of the fans or ventilators at a certain speed in accordance with a notice posted by the mine foreman. By this, with the approval of the mine inspector, the fan engineer must be guided. So there seems in the law of the state no provision made for variable air circulation.

THE RESULTS OF LOW VELOCITY

The velocity of the air is gaged to meet the normal requirements of the mine and unless the shots are fired after all the men have left the mine, the air will soon become cloudy and thick from the burning of the mine lamps and the breathing of the mules and men. Slowing a fan increases the danger. Doors are kept closed partly by the ventilating pressure existing when the fan is in operation. When this ventilating pressure is reduced a violent blast may partially open a door and in any event the door will be less forcibly closed and may pass what little air is flowing. When the fan is passing a small air current, regulators do not permit the same proportions of air to pass as they do when the air is normal. Thus the current is likely to be cut off some sections of the mine. If the fan is not merely slowed but stopped, natural ventilation may cause a reversal of the current. Such changes would be likely to make conditions ideal for explosions.

By decreasing the amount of air, we increase the gas present in the mine because while the evolution of gas continues constant, there is less air to dilute it and the gas is less rapidly removed from the mine. Hence by stopping or slowing the fan, we increase the percentage of the gas present and if we follow that reduction of ventilation by firing a number of shots, we arrange to have a dangerous condition of the atmosphere at the most critical period of the day's work.

DANGERS OF A LOW VELOCITY

I am of the opinion that slowing the fan increases the dangers inherent to firing shots. When the current slows down the suspended dust is deposited on all exposed surfaces. When other shots are fired, a new accession of dust is created and this is also deposited. Had the current remained as strong as before, the dust already in suspension and that which is derived from the shotfiring would in turn have been swept out of the mine.

As a matter of precaution, we should keep all the dust we can loaded out. We should wet the faces and sides thoroughly near shot holes. All shots in any one working place should be fired simultaneously and the firing should commence at the end of the airway nearest the upcast or return entry.

R. Z. VIRGIN.

Johnstown, Penn.

Timber Framing for Heavy Side Pressures

Replying to the criticism offered by Mine Superintendent, Johnstown, Penn., as published in COAL AGE, Feb. 24, page 651, permit me to say I am quite sure his method of timbering, as there shown, is all right for strength. I have used similar methods many times; but, in answering the original question, I had in mind a heading or drift where the room was limited. The method proposed by my critic would take up 2 or 3 ft. of space, which with the ever increasing size of the mine car would hardly be permissible.

Furthermore, "Mine Superintendent" has failed to read my statement correctly. He assumes that I suggested setting the post at an angle of 45 deg. from the perpendicular in order to support a side pressure. I suggested, in COAL AGE, Jan. 20, page 490, that the cap should be cut at 45 deg. and the leg cut the same plus the batter. The batter of a post in a drift is generally 2 in. to the foot, sometimes less.

My critic will pardon me for stating that he is mistaken when he says, I would not get strength from the corner brace. If this is properly spiked and fitted to the timber frame, it would shorten the leg, and, from memory, I think the strength of a piece of timber is inversely as its length.

JOSEPH VIRGIN

Plymouth, W. Va.

Drilling the Mine Floor

In your issue of Feb. 17, I notice an inquiry of an "Anxious Foreman," regarding "Cross Bar Timbering."

The method of support you suggest is O. K., but, if the pillars are not large enough, it will cause the floor of the mine to heave. I would suggest that "Anxious Foreman" should have holes drilled in the floor every 4 to 6 ft. along the entry to a depth of 3 or 4 ft., thus giving room for expansion. In fact, I think the longwall method of working would suit the conditions of the mine mentioned, better than room-and-pillar, as "Anxious Foreman" has 10 in. of draw slate available for packing. I have seen places driven wide under like conditions, which stood better than the narrow places.

DAVID FULTON.

Marion, Ill.

Handling Material Excavated in Sinking Small Air Shafts

A novel method of sinking the small air shafts used in ventilating the lignite mines, at Hoyt, Wood County, Tex., was introduced in 1906, which reduced the cost of this work more than 50 per cent. This lignite lies at an average depth of 34 ft., under a cover of sand and clay, which in dry weather will stand in the shafts for weeks without caving. When the mines were first opened, fans were used for ventilating; but with the progress of mining and the drawing of the pillars, openings and cracks extended to the surface and much air was lost and the ventilation thereby weakened. In time, the fans were discarded and air shafts usually 4½x4½ ft. were sunk at suitable points in the mine and small brick furnaces installed to afford ventilation.

It occurred to the writer, in charge of the work, that if the dirt excavated from these shafts could be dropped into the mine through a drill hole in place of being loaded and hoisted in buckets, both time and money would be saved. This method was tried and proved so satisfactory that it was used afterward wherever possible. The general method of procedure was as follows:

After determining the location of the shaft underground, usually in a room-neck or in an opening driven especially for the purpose, a line was run to locate the point on the surface, and a 12-in. drill hole put down into the mine, at a cost of 20c. per ft. Two men, alternating each other in the shaft, and furnished with a couple of chisel-end picks, a short breast auger, tamping stick, dynamite and a tripod or windlass and rope, could sink 6 to 8 ft. per day, in ordinary ground. In damp ground, the drill hole often clogged or closed completely, owing to the damp earth adhering to the sides, and to keep it clear a knotted rope suspended in the hole was drawn up and down at intervals. When the ground was hard, half a stick of powder, fired in a 2½-ft. hole, in each corner of the shaft, made the digging easier and did not choke the drill hole as did heavier charges in deeper holes.

A pit car standing on the mine tracks under the hole caught the dirt and was replaced when full, by the drivers, as a part of their regular work. The dirt was used to grade the roads in the mine or was hoisted and sent to the dump. All the shafts were timbered with 2-in. oak plank set edge to edge, with the ends notched to fit into each other, all being cut from a single pattern. By this method of sinking and timbering, a shaft could be sunk and timbered at a total cost of between $1.75 and $2 per ft.

NELSON BLOUNT.

New York City.

The Fireboss Question, A Mine Superintendent's View

In your issue of Mar. 9, I became much interested in the discussion by the various firebosses, pages 717 to 719, because I once filled that position myself. I have filled all the positions at various times in the anthracite region from slate-picker boy to mine superintendent, which is my present position; and when I look back to the eight years I spent in the capacity of fireboss, I cannot help but feel that their work is not fully understood by the average mine operator or superintendent. As a rule, these men have not filled the position themselves, and consequently fail to fully appreciate the services of firebosses.

"Fireboss," western Pennsylvania, truly suggests that the position of fireboss is often considered an unnecessary expense that operators are compelled to endure on account of the mine law. Let me say, the fireboss, if he is conscientious and faithful in the discharge of his duties, is one of the most valuable officials connected with the operation of a mine. He must be alert and fearless. But, you may say, all that is required of him is to see that the mine is free from gas. True, that is the only requirement within the purview of the law; but let us consider some of the responsibilities that devolve upon him and the dangers to which he is exposed in the daily discharge of his duties.

First, he must visit and examine all the breasts or working places in his district, any of which may contain gas in dangerous quantities, and this examination must be made before a miner is allowed to enter the mine. Not only must he test each place for gas, but he should examine the roof to see if it is sound and in safe condition. He should observe the props or posts to see that they are properly stood and have good cap pieces over them. If there is a parting or band of rock in the center of the coal seam, or if it be the custom to undermine the coal, he should examine to see whether or not the mining is too deep and the coal properly spragged. He should also observe whether or not the chamber is supplied with sufficient props and caps, which the miner may require during the day.

Picture the dangers to which the fireboss is exposed in making the rounds of these places. Rising each morning at 2 o'clock so that he may be on time at the foot of the shaft, he prepares for his lonely walk into a dangerous mine where death may be lurking in some chamber. The distance he must travel underground to reach his work is often two and may be three miles. Arriving at the first chamber on his rounds, he lowers his light and raises his lamp slowly toward the roof, watching the flame closely for any indication of gas. If none be found he places his mark, usually the figure indicating the day of the month, in a place that can be readily seen by the miner or mine foreman on entering the chamber.

Passing on to other working places, he is constantly reminded of the danger from falling roof or gas that he is liable to meet at any time. These dangers are greater, because in making his rounds he must hurry as the three hours required by law scarcely give him time to visit all the places in his district.

I have a distinct recollection of walking into breasts and being greeted with a rush of air caused by a fall in the place I was about to enter, the concussion being of sufficient force to extinguish my light. Perhaps, in another chamber, a careless miner has left his needle lying with the point facing the crosscut, and the fireboss hurrying on barely escapes having his eye put out or being impaled on the needle as with a bayonet.

In the letters of some of the firebosses I notice a slight tone of resentment, and the fact that I lay so much stress on the difficulties and dangers of the position might suggest that I too have the same feeling; such, however, is not the case. We must remember that operators, superintendents and managers of mines have crosses to bear as well as firebosses; and if the latter are laid off in idle times possibly, in many cases, it is due to the habit of the fireboss in contenting himself with simply fulfilling the dead letter of the law without any thought of working for the interest of the company that pays him. It is by honest conscientious work that the fireboss earns the commendation of his superintendent and increases his chances of promotion. The fireboss that will do this may reasonably hope to be mine foreman or superintendent at some time in the future not far distant. He should employ all his spare time in the study of mine work and familiarize himself with the principles relating to mining. This statement may cause some amazement, but I mean that very thing. Unless a man moves forward, he is certainly moving backward. I have proved this in my own experience and if space would permit I could give many concrete illustrations to show the practical working out of this truth.

By 7 o'clock the fireboss has completed his first inspection of the mine and goes to breakfast. On his return to the mine, about 8 o'clock, he consults his notes to see what is needed and orders the timber and other material required and sees that it is prepared and sent into the mine. He is then ready for his second inspection, in which he visits the more dangerous places in the mine and attends to other matters that may be required. He advises the miner concerning the cleaning and loading of the coal, the topping of cars, the location of shots, the charging and tamping of holes. On meeting the mine foreman, in the mine, the fireboss should be able to answer intelligently all questions concerning the various places he has visited, not only with respect to the danger or safety, which is strictly his concern, but he should be able to inform the mine foreman in regard to the quantity of loose coal the miner has on hand and whether or not the majority of cars in the working places are empty or loaded. He should also be able to state whether or not work ordered the previous day has been done.

This may seem to be too great a tax on his memory, but any successful fireboss of four or five years' experience will agree that he has a vivid recollection of the exact appearance of each place visited and is able to recall without difficulty in detail the condition of each place and what is needed. He knows the name and character of each miner, his laborer, and is familiar with their peculiarities. This is not given as an instance of good memory, but to impress the fact that every fireboss worthy of the name should be able to describe the condition of each place visited.

I agree that this is not required by the mine law; but, on the other hand, it does not require nine hours of a fireboss' time to fulfill all the requirements of the law, and the remainder of his time he should devote to the interests of the company that pays him. Every fireboss is or should be ambitious for promotion to the position of mine foreman, and in time to that of superintendent; and let me add there is no person so well fitted by training, for these positions, as the fireboss providing he has improved his time and fitted himself for higher work by study and reading.

In conclusion I will say the fireboss should be one of the last men suspended during a shutdown. To gain this preference, however, he should never shirk his duties and always strive to employ his entire time to the advantage of the company for whom he is working. A fireboss to be worthy of the name should be of so much value in the operation of a mine that the mine foreman would not think of such a thing as laying him off, or doing anything that would lessen his enthusiasm in the discharge of his duties. Every fireboss has the opportunity of making his services worth far more to the company than the price paid in wages. Should he do this there would be no question of the result of his efforts when he seeks promotion, because promotion will seek and find him. Remember the Chinese proverb, "I am not concerned that I have no position; I am concerned in fitting myself for a position."

Murray, Penn. M. J. CLEMONS,
Superintendent.

Examination Questions

Selected from State Examinations, or Suggested by Correspondents

Interesting Questions

Gas on Falls

Ques.—If in making your examination of a mine you found gas on the "falls," what would be your method of procedure and what would you recommend for safety, the mine being operated with naked lights?

Ans.—The first step to be taken to provide for the safety of the men while removing this gas will depend upon the quantity of gas accumulated and its location with respect to the ventilating current. A thorough knowledge of the surroundings and a careful estimate of the quantity of gas present is absolutely necessary before any steps are taken for its removal. All the men on the return of the current must be notified and in case the body of gas is considerable these men must be withdrawn. In case considerable gas has accumulated on the falls and it is found that the accidental explosion of the gas would communicate to a larger body of gas in some near-by abandoned workings, all the men should be withdrawn from the mine before taking any steps to remove the gas.

Having, in this manner, provided for the safety of the men, the next step is to station reliable men at each entrance or approach to the return current. Only safety lamps must be used in the work, which must be conducted from the intake side of the gas. It may be necessary to erect temporary brattices so as to deflect the air current against the roof and cause this to sweep the cavities or pockets above the falls. The work must proceed slowly, giving sufficient time for the air current to act upon the body of gas. The progress of the work must be closely watched and tests made from time to time with safety lamps. Every precaution must be taken to avoid a fresh fall of roof as far as possible. Should a fall occur the gas will be driven out upon the workmen and possibly ignited on their lamps. It is therefore necessary that all lamps be kept in a safe place and properly guarded to avoid such an occurrence.

Fire in Downcast Shaft

Ques.—In case the downcast shaft of a mine takes fire, what are the first three important things to be considered?

Ans.—(1) Notify the men at once by phone, directing that reliable messengers be sent to warn the men at the working face, in each section of the mine, and instructing them in regard to the best way of escape. (2) Short-circuit the air current at the foot of the downcast shaft by setting open the main separation doors between the intake and the return, so as to prevent the smoke and gases of the fire from entering the mine; at the same time shut down the ventilating fan. The heat of the fire will probably convert the downcast shaft into an upcast; and, if it is possible to open the doors so as to short-circuit the air current at a point further in the mine, much of the smoke will be withdrawn from the main airway, by so doing. (3) Get water on the fire as quickly as possible. As soon as the current reverses at the foot of the shaft, if it does so, it will be possible to fight the fire from below, which should be done to prevent the flame from extending into the entries in the mine.

Expansion of Air Due to Rise of Temperature and Fall of Pressure

Ques.—The temperature of the intake current in a mine is 35° F. at a point in the airway, where the anemometer gives a reading of 2820 ft. in 3 min. The airway at this point measures 8 ft. 4 in. wide and 5 ft. 9 in. high. (a) What is the quantity of air passing into the mine per minute? (b) Assuming that this mine is ventilated by an exhaust fan, what quantity of air would be passing on the return airway, at the foot of the upcast shaft, if the temperature at this point is 65° F. and the water gage gives a reading of 3.4 in.? Assume that the barometric pressure at the foot of the downcast shaft is 25.39 in. and the coal seam is practically level.

Ans.—The sectional area of this airway is $8.33 \times 5.75 = 47.9$ sq.ft. Assuming the reading of the anemometer is an average reading for the airway, the velocity of the air current is $2820 \div 3 = 940$ ft. per min. The quantity of air in circulation is then

$$Q = a\,v = 47.9 \times 940 = 45{,}026 = \text{say } 45{,}000 \textit{ cu.ft. per min.}$$

Since the fan is exhausting, the volume of air on the return airway is expanded in two ways; namely, by the rise of temperature and the fall of pressure. The expansion due to the rise of temperature is as follows:

$$\frac{460 + 65}{460 + 35} \times 45{,}000 = 47{,}755 \textit{ cu.ft.}$$

The expansion due to the fall of pressure is as follows: It is necessary first to reduce the water-gage reading and the reading of the barometer to a pressure in pounds per square foot; thus,

Water gage,

$$3.4 + 5.2 = 17.68 \textit{ lb. per sq.ft.}$$

Barometer,

$$29.35 \times 0.4911 \times 144 = 2075.58 \textit{ lb. per sq.ft.}$$

The absolute pressure of the air in the intake is, therefore,, 2075.58 lb. per sq.ft., while that in the return is less by the pressure due to the water gage, or 2075.58 — 17.68 = say, 2057.9 lb. per sq.ft.

The expansion due to the fall of pressure is, therefore,

$$\frac{2075.58}{2057.9} \times 47{,}755 = 48{,}165 \textit{ cu.ft.}$$

which is the total volume of air passing on the return airway.

Relation of Water Gage to Percentage of Gas in Current

Ques.—The air current in a certain mine is charged with marsh gas to the extent of 3 per cent. when the water-gage reading is 2.5 in.; what would be the percentage of gas in the current if it became necessary to reduce the speed of the fan till the water gage gave a reading of only 1 in.?

Ans.—In any given circulation, the volume of air varies as the square root of the water gage. Also, for the same quantity of gas, the percentage varies inversely as the volume of air. Therefore, the percentage of gas in the current, in this case, will vary inversely as the square root of the water gage. In other words, the percentage ratio is equal to the square root of the inverse water-gage ratio. Or calling the required percentage of gas x, we have

$$\frac{x}{3} = \sqrt{\frac{2.5}{1}}$$

$$x = 3\sqrt{2.5} = 4.74\%$$

Calculating Quantity of Air

Ques.—If the velocity of an air current is 75 ft. per minute in an airway 6½ x8½ ft., what is the quantity of air passing per minute?

Ans.—The sectional area of this airway is $6.5 \times 8.5 = 55.25$ sq.ft. Assuming the given velocity is an average velocity for the airway, the quantity of air in circulation is

$$Q = av = 55.25 \times 785 = \text{say } 40{,}000 \textit{ cu.ft. per min.}$$

Sociological Department

For the Betterment of Living Conditions in Mining Communities

A First Aid Packet

There is need for a first-aid packet, which will always be at hand when an accident occurs, will always keep its contents in good aseptic condition and which yet will be light and portable. Such an appliance appears to have been produced by W. V. Gage, a physician for the Colorado Fuel & Iron Co., stationed at Primero, Colo. It was briefly described

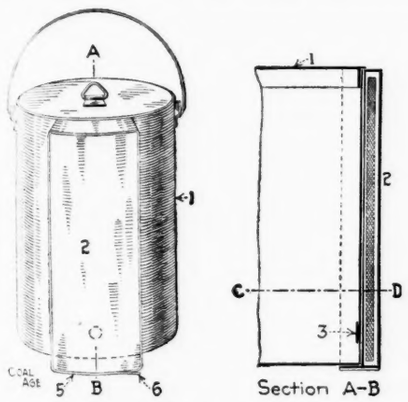


Fig. 1

DINNER PAIL AND PACKET

in our issue of Nov. 18 last, but will bear more extended description.

LIKE A TOBACCO BOX

The first-aid packet reminds one forcibly of those popular curved tobacco boxes, which fit the pants pocket, but in this particular instance the box is longer and narrower and fits the dinner pail. Moreover, it not only fits the pail, but is so affixed to it that the removal of the packet temporarily involves the spoiling of the dinner bucket. After the packet is removed, a new one can be affixed in its place by solder. The bucket is then as good as ever. In like manner, a packet can be torn from an old pail and soldered to the side of a new one.

AN ASEPTIC CONTAINER

The packet being air tight remains perfectly sanitary and not subject to inleakage, even when the pail is washed and scoured. When a workingman is moved from place to place in or around a mine, his first thought is of his dinner bucket. Consequently Dr. Gates thought he could not more certainly insure that every man would carry his packet than by attaching it firmly, and, in a sense, irremovably to his dinner bucket.

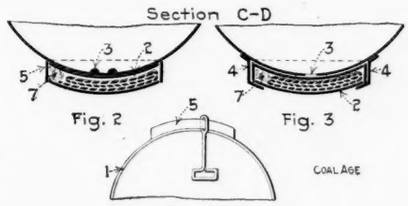


Fig. 4

DETAILS OF PACKET

The packet consists of two curved pieces of tin, about 8 in. long and 3 in. wide. After picric acid gauze, a triangular bandage or whatever else may be needed has been inclosed, the two side pieces are smoothly joined by a half-inch strip of tin. Soft solder is used to make a water-tight joint. When an accident occurs demanding first-aid materials, this tin strip can be peeled off by a can opener.

In Fig. 1, the dinner pail is marked 1 and the first-aid packet is numbered 2. At 3 is shown the soldering arrangement by which the two are fastened to each other. In Fig. 2, which is a partial cross-section along the line *C D*, shown in Fig. 1, the method of attachment is made plain, though the alternative plan in Fig. 3 might be used instead. In this design, guides 4 are attached to the pail, and in these the packet 2 slides. It is, however, secured in place by a plug 3, which passes through the side of the pail. In

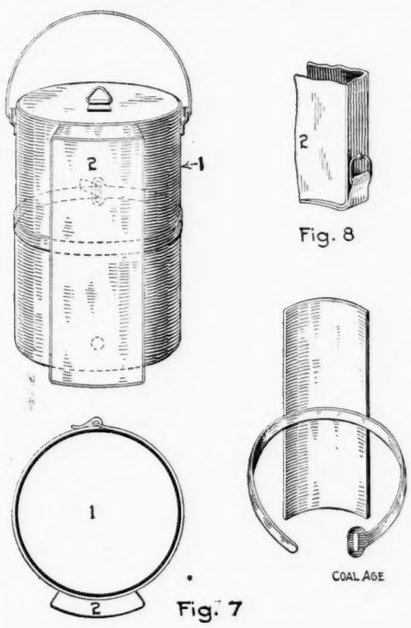
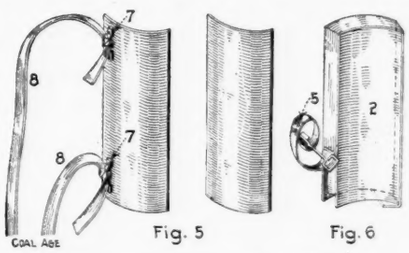


Fig. 7

OTHER MODIFICATIONS

Fig. 4, the "can opener" is shown attached to the end of the soft-tin slip 5, which has, as is shown at 6 in Fig. 1, a point of attachment at the base of the packet. A few turns of the wrist and this strip is completely withdrawn from the two curved faces of the packet.

The contents are permitted to drop out and two curved pieces of tin of suitable flexibility and shaped like those shown in Fig. 5 are ready for use as splints. Attached to one of these are lugs, marked 7. To these are found, already tied, strings 8, by which these strips of tin



HOW THE SPLINTS ARE MADE

can be secured as splints to the sides of any broken limb which may need their support.

Fig. 6 is another view of the same packet where the manner of removing the binding strip is more clearly shown. Another proposal is that the attachment of the pail to the packet be made by the use of a movable metal strap, as shown in Fig. 7, this strap itself being of use in providing a means whereby the splint can be affixed to the limb. Fig. 8 shows a simple method of attaching the binding strap, so that the use of the can opener can be made unnecessary. It is true that a can opener can be attached to the packet, but it is better to simplify matters by dispensing with it.

If an 8-in. splint is long enough for the support of the fractured bone, then it is certain that the scheme is one of great value, and as it assures that aseptic dressings will be always available when needed, its use is to be advocated.

Mine foremen should institute a course of prevention and cure of mine explosions, fires and accidents. All such matters should be taken up, considered, and discussed, with all the minor officials of the mine, in order that they may all be thoroughly drilled in such action as would be required in the event of a disaster.

A Remarkable Photograph, Exhibiting the Violence of the Bruceton Explosion of Feb. 24. The Smoke and Flame Are Escaping from the Main Portal

Rescue Team in Helmets, Preparing to Enter Mine after Explosion

Coal and Coke News

From Our Own Representatives in Various Important Mining Centers

Washington, D. C.

President Taft has deferred the conference which he had expected to call for the purpose of considering ways and means of preventing a coal strike. He has had several long talks, however, with Secretary Nagel and others, regarding the subject and is disposed to take such action as conditions seem to warrant when the proper time comes. At present, he is understood to feel that the facts in the case do not warrant active steps on the part of the federal government.

Action on Interstate Trade Commission Bill Improbable

Meetings of the Senate committee on interstate commerce, within the past few days, have shown conclusively that it will not be possible to secure a favorable report upon any measure such as has been asked for by various coal operators, whereby provision would be made for legalizing agreements of reasonable character among the coal operators, for the purpose of fixing prices and limiting production, or adjusting it to the demands of the market.

The committee is strongly divided upon the whole subject of anti-trust legislation, amendatory of the Sherman Act.

The Lee Bill for Coal Strike Arbitration

In a lengthy hearing, Mar. 25, before a subcommittee of the House committee on interstate and foreign commerce, to which the measure has been referred, Representatives Lee and Donohoe, both of Pennsylvania, presented arguments in favor of the Lee bill, which aims to give the federal government the right of intervention in coal controversies by an extension of the so called Erdman act. Mr. Lee spoke first, and urged the committee to report favorably on the bill, on the ground that it would effect an immense saving of money and of life if in any way strikes of a prolonged nature could be avoided. He estimated that the strike of 1902 cost the country $150,000,000, in direct loss of wages and profits as well as in sacrifices entailed upon manufacturers by reason of coal shortage.

Mr. Lee then described the Erdman act and showed how beneficial had been its operation. He enumerated the many and varied controversies in which it had been invoked and then read letters which he had received from organizations of railroad employees that are not now subject to the operation of the Erdman act, asking to be included within the scope of its provisions for arbitration. He laid stress on the fact that the act is not compulsory in its working but provides for voluntary arbitration.

Importance of the Industry

Mr. Donohoe spoke of the great importance of the coal industry of the country and said that it was such as to warrant a special mode of dealing with its difficulties. This accounted for the fact that the change requested in regard to the Erdman act was not to be extended to any other industry. He thought that strikes were more serious and had a greater tendency to become chronic in the coal business than in any other line and that they entailed more suffering.

The request was made by Mr. Lee that the committee call Charles P. Neill, commissioner of labor, John Mitchell and others closely identified with the strike of 1902, to testify as witnesses. This will probably be done.

Rates on Lake Coal from West Virginia

The Interstate Commerce Commission has handed down an important decision in the matter of the investigation and suspension of advances in rates for the transportation of coal by the Chesapeake & Ohio Ry., the Baltimore & Ohio R.R., the Norfolk & Western Ry. and the Kanawha & Michigan Ry. and their connections.

The principal findings of the commission are as follows:

1. From November, 1910, to March, 1911, defendants filed with the Commission tariffs advancing their rates upon lake coal, which is coal that originates in the West Virginia coal fields and moves, during the season of open navigation on the great lakes, to various ports on Lake Erie for transshipment by vessel beyond. Shippers protested that the proposed rates were unreasonable, and they were suspended pending investigation.

2. It appears that the Chesapeake & Ohio, Kanawha & Michigan, and Baltimore & Ohio made no showing which justifies the Commission in holding that the increased rates are just and reasonable; it is, therefore, held that these three defendants may not impose upon the traffic concerned higher rates than those in effect on Jan. 1, 1910.

3. As to the Norfolk & Western, the Commission is persuaded that the imposition of the increased rates here involved will not impose an unjust and unreasonable charge for the transportation service involved.

Alabama

Birmingham—The railroads in the Birmingham district are making preparations for a car shortage, which is already beginning to be felt, on account of the increased demand for coal.

Governor O'Neal visited Birmingham recently for the purpose of considering further the contract between the State of Alabama and the Sloss-Sheffield Steel & Iron Co., whereby the company's Flat Top mine is being worked by state convicts. The agreement is at present on a basis of 42½c. per ton of coal mined, and the governor maintains that this figure should be raised to 45c., in order to place the earnings of the convict labor on a parity with those of free labor. Failing a satisfactory adjustment of this rate and the correction of certain alleged unsanitary conditions at the Flat Top mine, the governor favors abrogating the contract.

Colorado

Colorado Springs—John T. Milliken, of St. Louis, and H. McGarry, of this city, president and manager, respectively, of the Golden Cycle Mining Co., have taken over the entire coal holdings of the Pike's Peak Coal Co. and the Central Fuel Co., both of this city, and the stock of the United Fuel Co., of Denver, formerly held by J. R. McKinnie and other local interests. Milliken & Garry are now sole owners of 1760 acres of coal land north of this city, including the Pike View mine, the largest in this section. Milliken is spending $35,000 in improvements and will double the daily output, making it 1000 tons.

Denver—The Interstate Commerce Commission recently heard arguments on the application of the Colorado Coal Traffic Association, to compel the Colorado & Southern and Denver & Rio Grande railways to adopt a new plan of car distribution for coal shipments.

Illinois

Springfield—The state mining board is in receipt of a letter announcing that all previous state records were broken recently by the three Gillespie mines of the Superior Coal Co., a subsidiary of the Northwestern railroad. The figures sent in show that the average for the six days of one week was 10,984 tons per day, and that the highest day's run was 11,522

tons. Mine No. 3 averaged 4094 tons per day for the week, and reports a total loss in time of 75 min.; 40 min. while waiting for cars and 30 min. while waiting for repairs to be made to the machinery.

Danville—It is stated here that the three Dering mines near this city, the two mines at Clinton, Ind., and the two at Sullivan, Ind., will not be operated by the Brazil Block Coal Co. after Apr. 1. The company's three-year lease on these properties expires on that date, and, it is understood, will not be renewed. Whether the Derings intend to sell the mines rather than lease them or whether the Brazil company does not care to operate them for another term of years, is not known. It is understood that the mines have been run at a good profit for the past three years.

Belleville—Nearly every coal mine in the Standard field in the vicinity of Belleville, and down as far as Marissa, is working two shifts of eight hours each, in an effort to double their capacity. The greater portion of this coal is going to the Illinois Central R.R.

Chicago—Discrimination by railroads of the Central West in the distribution of cars in favor of their own coal mines and to the detriment of other operators is to be the subject of an investigation by the Illinois Railroad and Warehouse Commission. Indiana and Kentucky state officials will assist in the inquiry. The work probably will begin immediately after the April session of the body, and may continue several weeks. It is said that the investigation will disclose that the railroad and mining interests in Illinois, Indiana, Ohio and Kentucky are as closely allied as the railroads and the steel industry in the North and East. The railroads are reputed to have almost absolute control of the best and largest producing mines of the three states, and it is alleged that they discriminate against other mine operators.

The Illinois Coal Operators' Association met here recently and appointed a committee to confer with officers of the United Mine Workers in an effort to avert the threatened strike of coal miners in Illinois, Apr. 1. Closely involved with the strike situation is the car-shortage problem. Complaints of car shortages in various districts were made by many of the operators. The effort of the mines to turn out large quantities of coal before the strike comes on has caused a great demand for cars.

Indiana

Brazil—The most important work advocated by the recent annual convention of mine workers of district No. 8, is the organizing of the coal strippers. A great deal of coal is being stripped, instead of mined, in this county at present, and common labor is used in the work. The miners now intend to organize the coal strippers so that they will receive the same wages as the miners and day men employed in and about the other mines of the district.

Bicknell—The record for a day's output from the mines in and around Bicknell was broken, Mar. 25, when 143 railroad cars were loaded, making a total shipment of 5720 tons. The miners in this section do not want a strike; they are satisfied with their present wage scale and are dreading the order to lay off.

Diamond—The Wizard mine of the Hall-Zimmerman Coal Co., located on the Central Indiana R.R.; the Schrepferman No. 8 mine and the Zeller-McClelland Block No. 3 mine, at Diamond, and the Bee Ridge Coal Co.'s mine, all in Clay County, are preparing to close down indefinitely after the suspension of work which is expected to follow the Cleveland wage-scale conference. The owners say they will not go to the expense of keeping the mines in shape for work following the suspension.

Linton—Mines on the Vandalia Branch have been under a great handicap lately because of a serious cave-in under the Vandalia R.R. tracks between Sponsler and the old Island City mine. It was impossible to get cars to or from the mines for a number of days. The cave was about 60 ft. long and immediately filled with water.

Iowa

Des Moines—The state mining department has sent out a warning. Citizens of the state are urged to lay in supplies of coal before the first of the coming month if they do not wish to be caught short during the period of suspension. The department says that the suspension will last at least 60 days, and possibly 90, or even longer.

Kentucky

Louisville—A peremptory writ of mandamus was issued, Mar. 20, by the Commerce Court against the Louisville & Nashville R.R. and the Southern Ry., to compel them to carry coal from the mines of the Stony Fork Coal Co. and the Ralston Coal Co. in Kentucky to the southeastern states. The refusal of the two railroads to transport the coal grew out of a dispute as to which should furnish the necessary cars. It was shown by the evidence that the coal companies, because of their inability to have their product transported to markets in the Southeast, were practically put out of business, as 80 per cent. of their coal was marketed in that territory.

Paducah—Anticipating a strike in the soft-coal mines, the Illinois Central is hauling large quantities of coal from western Kentucky mines to its yards in Paducah. This coal will be distributed over the system as needed in the event of a strike.

Barbourville—The Mineral Development Co., composed of Philadelphia capitalists, is preparing to begin coal and timber operations on a large scale in Letcher County. The property has been opened for development by the new Lexington & Eastern R.R., and as soon as branch lines are built a number of big coal operations will be started. A contract was recently made for the extension of a three-mile line into the Boone Fork district, and the first coal operations in that field will be started by the Pennsylvanians.

Maryland

Lonaconing—It is understood that, before long, operations will be resumed at the old Jackson mine and extensive developments undertaken at the Caledonia mines. This valuable property has always been looked upon as the greatest asset of Lonaconing. There is a large acreage of excellent coal, of easy access, in the smaller seams and it is thought that one of the most profitable enterprises of the Maryland field could be established here.

Ohio

Columbus—Operators in eastern Ohio are much gratified over the recent ruling of the Interstate Commerce Commission which grants a reduction on the lake rate from No. 8 field of 10c. per ton. This is the culmination of a fight between the operators and the railroads which has lasted for more than a year. It is an entirely different action from the one brought by the Eastern Ohio Operators' Association against the Wheeling & Lake Erie R.R., in which a rate reduction was ordered by the Ohio Railway Commission.

Cambridge—The Minnehaha & Little Kate No. 2 mines of the National Coal Co., near Cambridge, which lie about two miles apart, have been connected and in the future the two mines will be operated as a unit.

St. Clairsville—Work will be commenced next month on the opening of a new mine at Fairpoint, Belmont County, to employ about 600 men, when in full operation. The Provident Coal Co., a Cleveland corporation, recently purchased several hundred acres of coal lying along the Cleveland, Lorain & Wheeling division of the Baltimore & Ohio R.R., and will spend about $300,000 in opening and equipping the mine.

Lisbon—The Card & Presser Coal Co. recently announced that it would abandon the Klondyke coal mine which has been in operation here for a number of years. The company has leased about 300 acres of coal land four miles north of

town and will open a large commercial mine at once. It will take coal from the No. 6 vein, which runs from 4½ to 6 ft. in thickness and is of excellent quality. The property is located along the Erie tracks and the old West Pittsburg tipple will be used.

Cleveland—A conference of 32 operators and as many miners' representatives from western Pennsylvania, Ohio, Illinois and Indiana, met in Cleveland, Mar. 20, to negotiate new wage contracts for these states, if possible. Nothing decisive was accomplished, prior to adjournment Mar. 22, and the matter was left in the hands of the joint scale committee, consisting of eight operators and eight miners, two from each state. The policy committee of the United Mine Workers convened here Mar. 25.

Oklahoma

McCurtain—A disastrous explosion took place at the No. 2 mine of the Sans Bois Coal Co. near here, in the morning of Mar. 20. The cause of the explosion has not been determined. Eleven men escaped from a manway at the time of the blast; 25 have since been rescued alive, and at last reports, 69 bodies had been recovered. The number killed is reported as 80, based on a total of 116 men in the mine at the time of the explosion. Rescue work was started immediately; the local government mine-rescue car was soon on the scene and No. 4 car arrived from Iowa on Friday.

Pennsylvania

Bituminous

Dravosburg—Over 400 men employed in the Risher mine at Dravosburg quit work Mar. 20, alleging that the screens used at the mine allow too much coal to sift through to the slack pile. There has been no disturbance, the miners contenting themselves with standing about in small groups and discussing the situation. They have been complaining for some time that the screens are too large.

Indiana—The plant of the Tearing Run Coal Co., operated near Homer City for several years by J. M. Guthrie & Sons, of this place, has been leased to the Townsend Coal Co., of Philadelphia. The operation includes 300 acres of coal and the lessees agree to mine not less than 100,000 tons a year.

Du Bois—It is understood that the Cascade Coal & Coke Co. will begin at once the construction of 200 additional coke ovens at Sykesville. This will just double the capacity of the present plant.

St. Marys—The Shawmut Coal Mining Co. is building a new and larger tipple at Elbon, to accommodate its increased output at that point. Ten new houses have been erected and ten more are to be put up this summer. The Shawmut & Northern R.R. has plans for building four miles of new road between Mahoning and Mosgrove, points on the Allegheny River, and also two miles of new railroad between Tidal Branch Junction and the Allegheny. Other improvements are to be made at various points to meet the demands of larger operations.

Pittsburg—A sweeping victory was won, Mar. 19, by coal shippers from the Pittsburg district to lake ports when the Interstate Commerce Commission ordered a reduction of the rate on bituminous coal from 88c. to 78c. per ton. Advances of rates on coal from Virginia and West Virginia fields to lake ports, made by the Chesapeake & Ohio, Baltimore & Ohio and Kanawha & Michigan railways, were disapproved by the commerce commission. Advances made by the Norfolk & Western on the same traffic were approved.

Anthracite

Scranton—The Lackawanna R.R. was found guilty in the federal court, at Buffalo, Mar. 19, of violating the commodities clause of the Hepburn act and was fined $2000. The government charged that in 1909 the company shipped hay from Buffalo, N. Y., to Scranton, Penn., free of charge for the use of mules in mines owned by the company in Pennsylvania.

In a gas explosion caused, it is thought, by mine settlings, which disturbed the gas mains, nine persons were killed and two injured, early Mar. 20, in Dunmore. Two miners' families, comprising two women and seven children, were either blown to pieces in the explosion or burned in the fire that followed and destroyed three houses. More than twenty dwelling houses near the scene of the explosion were badly damaged by the concussion and the flying timbers.

Wilkes-Barre—The exodus of miners from the anthracite fields in anticipation of a suspension of work was augmented recently by the departure of 100 Slavonians from the Nanticoke region, who left here for New York. They will sail for Austria.

Shamokin—The 800 employees of the Scott shaft, owned by the Mineral Railroad & Mining Co., who went on strike Mar. 18, because the company refused to sell them pea coal, have returned to work.

Pottsville—The Pine Hill Coal Co., operated by Scranton capitalists, and located at Minersville, near here, posted a notice Mar. 19, announcing that the employees will be granted an increase in wages of 10 per cent., to take effect Apr. 1, and that other working matters will be adjusted satisfactorily with the men. Several years ago this company put into effect an agreement whereby the employees share in the increased earnings of the company.

Tamaqua—The rest of the mine workers, about 3500 in number, employed by the Lehigh Coal & Navigation Co., in the Panther Creek Valley, who quit work recently because some of the men in the mines refused to join the union, returned to work Mar. 18.

West Virginia

Charleston—A trial of much interest to coal men has been going on in the United States Court at Cincinnati for the past four weeks; namely, the suit of the McKell Estate vs. the Chesapeake & Ohio Ry. Co. The McKells own 23,000 acres in the heart of the New River coal field, probably the most valuable tract of the size in West Virginia, and have sued the railway company for $3,700,000 damages, with interest, on a contract made by M. E. Ingalls when president of the Chesapeake & Ohio with the late Col. T. G. McKell. Many prominent operators and engineers of the state have testified in the case, as the questions involved concern almost every phase of the coal business. Governor Harmon, of Ohio, for the railway company, and Judge Holt, of Huntington, W. Va., for the McKells, are the leading counsel, and the case has been bitterly fought at every step. Some remarkable testimony has been given, which is of great interest to coal men.

Welch—Eighty-one men were killed, Mar. 26, by a gas explosion in the Jed Coal & Coke Co.'s mine, at Jed, W. Va., six miles from here. Only 11 men escaped alive, and one of these died within an hour after being brought to the surface. So far, 33 bodies have been located. The fans, although damaged, continued to operate, with the result that enough air was present to admit searching parties immediately. Less than half an hour after the explosion, relief measures were started. Oxygen helmets and other appliances were rushed from the plant of the United States Coal & Coke Co., nearby, and a government rescue car, *en route* to Huntington, W. Va., was turned back. The mine was inspected Mar. 22, and pronounced safe. Preliminary investigations so far have not divulged the cause of the explosion. Barometers in this vicinity have been showing unusually low readings for the last week without the usual atmospheric changes.

Canada

Merritt, B. C.—The British Columbia Development Co., capitalized at $800,000, has been organized by a group of Minnesota capitalists, including several Minneapolis men, and has acquired control of 1000 acres of coal lands in and about the town of Merritt, Nicola Valley, British Columbia. S. H. Hudson, Benson, Minn., is president; J. W. Irwin, Minneapolis, vice-president, and P. M. Endsley, Minneapolis, treasurer.

Personals

G. P. Bartholomew, who has been engaged in consulting work for the Pennsylvania Coal & Coke Corporation for the past seven months, has returned to his office, 30 Church St., New York.

J. C. Maben, president of the Sloss-Sheffield Steel & Iron Co., recently visited the company's properties in the vicinity of Birmingham, Ala., and elsewhere in the state, also looking over the plans for extensive improvements that are contemplated.

William L. Martin has resigned as superintendent of the Pratt No. 1 division of the Tennessee Coal, Iron & R.R. Co.'s coal mines, effective Apr. 1, to become superintendent of the Banner mine of the Pratt Consolidated Coal Co., succeeding Milton H. Fies.

John H. Parrott, general manager of the American Coal Co., recently visited Lonaconing, Md., for the purpose of inspecting the company's properties in that locality and with a view toward possibly resuming operations at the Jackson mine, as well as undertaking development of the Caladonia mines.

Maxwell L. Barker, of Louisville, Ky., formerly president of the Straight Creek Coal Co., of Pineville, has been elected president of the reorganized Nebo Consolidated Coal & Coke Co., in which he recently purchased a controlling interest. R. B. Winkler will remain as superintendent of the Nebo mine.

N. P. Turner has resigned as chief engineer of the Cuba R.R., and in association with L. D. Moore, of New York, will engage in consulting work, general engineering and exploration in the West Indies and the tropics. Mr. Turner will be located for the present at Hotel Camagüey, Camagüey, Cuba.

Milton H. Fies has resigned as superintendent of the Banner mine, of the Pratt Consolidated Coal Co., effective Apr. 1, and will engage in business for himself. Up until several months ago, Mr. Fies was engaged by the Birmingham Coal & Iron Co. as general superintendent, in charge of the Mulga and Short Creek mines.

W. F. Guiterman has been appointed vice-president and general manager of the New River Collieries Co., which is owned by the Guggenheim interests, and is one of the largest producers in the New River field, West Virginia. It is understood that Mr. Guiterman will make his headquarters in New York, and that a resident mine manager will be appointed.

William D. MacLean, general purchasing and sales agent for the Utah Fuel Co., has resigned to become general auditor for the W. G. Sharp coal properties at Mohrland, Hiawatha and Black Hawk. A. D. Pierson, for years assistant to Mr. Mac Lean, has been named general sales agent for the Utah Fuel Co., and H. N. How has been appointed general purchasing agent to succeed Mr. MacLean.

Obituary

John Maguire, one of the best known mining men in the anthracite region of Pennsylvania, died in the Pottsville Hospital, Mar. 11, following an operation. He had been an invalid for several years. Mr. Maguire was for many years mine inspector of the eighth anthracite district and later became division superintendent for the Philadelphia & Reading Coal & Iron Co., with supervision over all collieries south of the Broad Mountain. He was born in Whitehaven, Cumberland, England, in 1845 and at early age came to this country, serving in the Union Army during the Civil War as a member of the Seventh Pennsylvania Cavalry. Under his supervision, as district superintendent, the remarkable record of winning 95 per cent. of the coal bed was made at the Brookside colliery of the Reading company. Mr. Maguire served as mine inspector from 1894 until 1902. His conduct of the office was appreciated by operators and miners alike; he was a man of sound judgment and absolutely fearless in the performance of his duty. Mr. Maguire was known as one of the men in this field most thoroughly versed on anthracite mining and his advice was always eagerly sought.

Construction News

Flint, Mich.—It is reported that Saginaw mining interests will expend $160,000 in opening a mine within the Flint city limits. A shaft will be sunk and about one mile of railroad built to connect with the Grand Trunk R.R.

Bay City, Mich.—A shaft will be sunk and a mine opened on the Handy coal property, near the Whatcheer mine, south of Bay City. The proposed equipment calls for electric mining machines and haulage motors and a first-class installation throughout.

Canton, Ill.—The Big Creek Coal Co. is planning improvements for its Cuba mine in order to materially increase the output.

Superior, Wis.—The Great Lakes Coal & Dock Co., of Minneapolis, a subsidiary of the White Oak Coal Co., plans extensive improvements for its dock here, which it has recently leased from the Great Northern Ry. These improvements will include widening the dock 150 ft., and installing at least one new bridge, besides other equipment.

Earlington, Ky.—The Nebo Consolidated Coal & Coke Co. has been reorganized, with Maxwell L. Barker, of Louisville, as president, and extensive improvements will be made in order to greatly increase the output. Modern machinery will be installed.

Charleston, W. Va.—The Gauley Mountain Coal Co., Ansted, W. Va., will open up three mines on Rich Creek to develop 12,000 acres of No. 2 Gas seam, and will erect a large central power plant. J. J. Marshall is chief engineer.

Publications Received

REPORTS RELATING TO MINERALS AND MINING IN NEW ZEALAND, 1911. 160 pages, 8½x13 in., illustrated. John Mackay, government printer, Wellington, New Zealand.

The general report on coal mines takes up 40 pages. A specially interesting section of the book is that devoted to a separate report on the operation of the government-owned coal mines.

REPORT OF WEST VIRGINIA GEOLOGICAL SURVEY ON JACKSON, MASON AND PUTNAM COUNTIES. 387 pages, 6x9 in., 36 plates and illustrations and case of 3 maps. Price, $2. West Virginia Geologic Survey, Morgantown, W. Va.

In addition to the detailed study and description of all the rocks, minerals, soils, streams, and industries found within the area, the geologic map gives the structural contours on the Pittsburg coal horizon, as well as the approximate area underlaid by that bed. The topographic map shows by contours and figures the elevation of the surface, and its character, whether steep, rolling or level, and in addition gives all the streams, roads, railways, towns, churches, school houses, mines, houses, etc., in their correct locations.

INDUCTANCE OF COILS. By Morgan Brooks and H. M. Turner. Bulletin No. 53 of the Engineering Experiment Station, University of Illinois. 72 pages, 6x9 inches, illustrated. Free on request.

This bulletin discusses the theory and determination of the self-inductance of coreless coils. An empirical modification of the common formula for the inductance of solenoids, is presented as the Brooks universal formula applicable to all forms of cylindrical coils. Easy methods are given for predetermining the dimensions of a coil for any required reactance or inductance, for any purpose from the massive power protective coils to the smallest instrument coils. Definite coil proportions are assigned for producing the maximum inductive effect with a given length of conductor and data are furnished on the relation of the mutual inductance of adjacent coils to their self-inductance.

Industrial Notes

The Dominion Iron & Steel Co., Sidney, N. S., has placed an order with the Ruggles-Coles Engineering Co., 50 Church St., New York, for one of their Class A-14 dryers for drying 40 tons of coal per hour.

The new coal-handling plant for the Metropolitan Coal Co., at Chelsea, Mass., the plans and specifications for which are being prepared by Monks & Johnson, architects and engineers, 7 Water St., Boston, Mass., includes an extensive piled wharf, discharging berth, lighterage berth for coaling tow-boats, conveying machinery, cable road, 10,000- to 15,000-ton elevated pocket, 2000-ton ground storage shed, revolving pickup tower, storage facilities for 15,000 tons of bituminous coal in the open, screening plant for sizing anthracite screenings, boiler plant, stable, offices, etc. It is estimated that this new equipment will cost over $100,000.

Coal Trade Reviews

Current Prices of Coal and Coke and Market Conditions in the Important Centers

General Review

The tense feeling in the coal market continues unchanged. Consumers and producers are both keenly watching the results of the wage conferences, many of the larger interests having special representatives on the ground to insure reliable and prompt reports on the situation. It is purely a strike market and has been accepted as such by the trade, which is now playing a waiting game.

The movement to the Eastern markets continues to be only sufficient to meet current demands, and none of the companies are accumulating any surpluses. Prices are at the same high level, although they vary considerably with the reports on the labor situation. Water freights are somewhat lower and the railroad congestion is rapidly improving. In the Pittsburg steam markets there is a disposition on the part of the consumers to shut down their plants rather than buy at the prevailing high prices.

The improvement in transportation in Ohio, due to the milder weather, has resulted in a heavy movement of delayed coal into the consuming centers. Emergency fuel, however, still commands a substantial premium, especially in the steam grades, and there is considerable buying for speculative, as well as storage purposes. The Kentucky trade experienced a decided flurry on some heavy orders from St. Louis, but the market there soon broke and the Kentucky operators are now waiting for the strike to materialize.

The demand in the Middle West is unprecedented with the exception of St. Louis, where the market was overshipped, and now has coal on demurrage. There is no free coal to be had at other points, and the large consumers are becoming worried and bidding up prices on all grades. There is a decided stiffening in all departments and the producing companies are mostly sold well ahead.

Boston, Mass.

The week has shown a fluctuating market, according as the news tended to back up the strike talk or show possibilities of a compromise. Mild weather was followed by a northeast snow storm and prices hardened measurably. This market, even for the near inland points, is now practically confined to all-rail delivery for bituminous and a heavy tonnage is moving over the lines with Eastern connections.

Most of the regular shippers and a number of new ones have coal going to the junction points for reconsignment. Prices are being held at a high range for such coal in transit and were it not for fluctuations during warm weather and rumors of settlement early in the week they would be higher still. As it is, the average is about the same all-rail as a week ago, although at tidewater distributing points, such as Boston, Providence and Portland, new high prices are reported.

In anthracite the companies are rapidly going out of business, at least so far as concerns Eastern shipments. Consignments from New York have practically ceased on all sizes and Philadelphia has been so seriously curtailed that only a very few special kinds and sizes are to be had, and those only in small quantities.

On anthracite all-rail, and at New York, on individual coal, premiums run all the way from $1@2, although the offerings seem small.

The following list gives some idea of current prices at wholesale:

Clearfield, or any bituminous, f.o.b. Philadelphia	$3.60@4.10
Clearfield, f.o.b. New York	3.50@4.35
Clearfield, *en route*, f.o.b. mine basis	2.25@3.50
Pocahontas, New River, f.o.b. Hampton Roads	4.75@5.25
Thacker and Kenova, f.o.b. Hampton Roads	3.50@4.00
Pocahontas, New River, Boston, on cars	6.00@6.75
Pocahontas, New River Providence, on cars	5.75@6.75
Anthracite, stove, etc., all-rail, f.o.b. mines	4.00@5.50
Anthracite, domestic sizes, f.o.b. New York	5.00@6.75

New York

It is believed the New York trade is facing the possible suspension at the mines with very meager supplies. The demand here has been urgent in the extreme, and in many instances shippers have been obliged to go into the open market for tonnages to meet their contracts. No accumulations are being made at the piers and with the strike now practically at hand no hopes are entertained for getting any.

Prices continue to rule high, and there is no perceptible evidence of the situation easing off in either anthracite or bituminous. The lowest grades of bituminous are quoted at $3.50@3.75, f.o.b. piers, which would be equivalent to about $2 at the mines. A further complication, to a situation already bad enough, is now threatened by a labor shortage at the mines shipping to the New York markets. The movement on the railroads has improved considerably, but is by no means back to normal.

We continue to quote wholesale anthracite prices, f.o.b. New York, as follows:

Broken	$5.50@6.00
Egg	5.50@6.00
Stove	6.50
Chestnut	6.50
Pea	5.00@5.25
Buckwheat No. 1	4.00@4.50

Philadelphia, Penn.

The past week has been one scramble for coal. Householders realize that every indication points to trouble at the mines on Apr. 1, and dealers have been besieged on all sides to fill orders. This is not only true of the residential districts, but the mill districts as well. Quite a number of the manufacturing plants in this city use the smaller sizes of anthracite, and none of them have any great stocks on hand. As the supply from the mines has been inadequate to fill more than current business, many of them will go into April very poorly fortified against a lengthy struggle between the miners and operators.

Pea coal is bringing from $3@3.50 at the mines, buckwheat from $2@2.50, and of the size called rice, there does not seem to be any at any price. As a matter of fact, most all the operators have contracts on which they are applying their entire output, and little free coal is on the market. The domestic sizes are also in excellent demand, and dealers are taking anything that is offered.

The individual operators are reaping a harvest, as the so called circular prices are entirely ignored, and most every car of coal sold now brings a good premium. For spot coal, anywhere from 50c. to $1 above the circular is being paid. The large operators in no case, it is understood, have advanced the price over the ruling circular, for which they are receiving little credit from the press in this vicinity. Any advance in the price of any size is ascribed to the coal trust, who are also unjustly accused of holding coal back at the mines. It is possible some of them are laying aside some of the output for their own use at the mines, but outside of this, the entire production is coming to market. The first of April will see a comparatively small tonnage of anthracite coal on hand.

Pittsburg

Bituminous—The meeting at Cleveland has afforded no good reason to change the original expectation that there will be a suspension of several weeks—these reports having guessed six weeks as the most probable duration—with proposals and counter proposals in order to keep up interest and show that the respective parties were making efforts toward a settlement.

The bituminous-coal market continues in a very unsettled state, but is not as excited as it was, as consumers and producers have now accepted the scarcity, which will merely be accentuated gradually after Apr. 1 when the mines presumably will close. Several weeks ago prices reached such a point that regular large consumers, who had made some provision against the impending suspension, refused to pay them and the buying in the open market has been merely of odd lots. In many cases the requirements of consumers are of such a nature that they will cease operations rather than pay fancy prices.

The bottom of the market may be placed at the same level as in the last report, but transactions are more limited, and especially high prices are more frequently paid for odd prompt lots. We therefore quote as the minimum of the market, and coal hard to buy at the prices: Mine-run and nut, $1.50@1.60; ¾-in., $1.65@1.75; 1¼-in., $1.90@2; slack, $1.40@1.50, per net ton at mines, Pittsburg district.

The Elkins Coal & Coke Co. is reported to have closed a 20-year contract with the Lehigh Coke Co., South Bethlehem, Penn., for 1200 to 1500 tons of coal daily, for the byproduct coking plant just being completed. This plant was built by German interests, to supply coke to the Bethlehem Steel Co. for 20 years, with an option reserved to the Bethlehem company to buy the plant at the expiration of the period. The coal is to be mined from the new Bretz field.

Pittsburg-district operators are somewhat more anxious to close the wage negotiations than they were before the Interstate Commerce Commission decision reducing the lake rate from 88 to 78c. While the operators asked for a reduction to 50c., they were not certain of securing any, so that the 10c. saving is of interest and will make the district more keen in securing lake tonnage.

Connellsville Coke—The market is not closely quotable, as demand has decreased and the supply also. Consumers are trying to get along with the coke available, and are chary of buying additional tonnages at the fancy prices asked. We quote the market roughly at $2.25 for furnace and $3 for foundry coke, per net ton at ovens.

The *Courier* reports production in the Connellsville and lower Connellsville region in the week ending Mar. 16 at 408,237 tons, an increase of 10,000 tons, and shipments at 4525 cars to Pittsburg, 6271 cars to points West and 1189 cars to points East, a total of 11,985 cars, or a decrease of 149.

Baltimore, Md.

Although a few of the operators reported a tendency to ease up somewhat in the Baltimore market, the latter part of the week found the demand for coal just as strong and prices just as firm. The majority of the large operators in this city state that they are unable to supply consumers with sufficient fuel, owing to the inability of the operators to furnish the coal. It may not be generally known but there is a scarcity of labor in many of the coal fields of West Virginia at the present time. One operator who returned to Baltimore a few days ago made the remark that between 2000 and 3000 additional men could be utilized in the mining districts if they were to be had.

Lack of labor has, in many instances, handicapped the operators in their efforts to fill orders at the prevailing high prices. Prices have gradually advanced since about the time the strike started in England. This was nearly three weeks ago, and since that time almost phenomenal prices have been asked and received by the trade.

Buffalo, N. Y.

The market began to slack off several days ago and at present there are a few jobbers with coal on track that they are finding very little market for. The better weather has released a lot of coal that was held up at various points and the New England demand dropped off a week ago, on account of supplies from other fields, probably West Virginia chiefly. Besides the consumer now finds the rush prices too high for him to buy more than he is obliged to.

It is still impossible to quote actual bituminous prices. Nominally they are $2.60 for Pittsburg three-quarter, $2.50 for mine-run, $2.25 for slack, and $4.25 for the best Connellsville foundry coke, but the actual price, paid in emergency, runs all the way to $1 higher. Coke is also from 25 to 50c. above former prices, if the consumer is short. It may not go down again when the labor troubles are over, as consumption is improving and it has been very low for a long time.

The anthracite situation is unchanged. the demand being strong enough to take everything the mines can turn out. Lake shippers are very uneasy over the outlook as with many vessels loaded for early shipment, there is none to load now, while the upper-lake docks are bare, as a rule. All sizes are almost uniformly scarce, which is also a very unusual condition of things at this time.

Columbus, Ohio

The feature of the Ohio market during the past week was the strong demand for all steam sizes as a result of which prices have ruled higher than for months past. Steam users have been brought to realize that the possibilities of a suspension after Apr. 1 are great and every effort has been made to stock up. But railroad traffic has been so demoralized and the car shortage so pronounced that the efforts to collect a supply of fuel were not productive of great results.

As a result of the movement to cover, practically all of the railroads in Ohio have supplies to last from 30 to 60 days and some of the larger manufacturing establishments are also well supplied. But others are not fortified for a long suspension and much inconvenience is expected if the strike is prolonged for any great period. West Virginia is beginning to ship coal westward now, attracted by the high prices prevailing in that market.

The condition in railroad transportation is not much improved. Congestion still prevails at Toledo and other connecting points and empties are slow in finding their way back to the mines. As a result operations have been restricted to about 65 per cent. of normal during the past week.

Prices prevailing in Ohio are as follows:

Hocking Valley	
Domestic lump	$1 65
¾-in.	1 80
Mine-run	1 60
Nut	1 75
Nut, pea and slack	1 65
Coarse slack	1 55
Pittsburg No. 8	
¾-in	$1 70
Mine-run	1 70
Coarse slack	1 70
Pomeroy Bend	
Domestic lump	$1 75
¾-in	1 60
Nut	1 50
Mine-run	1 50
Nut, pea and slack	1 50
Coarse slack	1 40
Kanawha	
Domestic lump	$1 45
¾-in	1 60
Mine-run	1 60
Slack	1 50

Cleveland, Ohio

Conditions in this market are such that it is a difficult matter to give any accurate information as to which way the market will go. Operators and miners, at their meetings held in this city, have not arrived at any definite results, and the market at the present time is in such a condition that it is impossible to determine what will happen between now and Apr. 1.

There has been considerable coal shipped to this market in the past week by parties, who are holding it on track with the expectancy of obtaining higher

prices. They will, no doubt, realize their expectations, as whether or not the operators and miners get together, there certainly will be a suspension for at least 30 days, and the prices on all grades will in consequence increase very materially.

The larger manufacturers in this vicinity have stocked up sufficiently to keep them running for at least 30 days or more. The smaller concerns not having facilities to handle the coal, will have to pay the increased prices should the strike materialize.

Charleston, W. Va.

The conditions that prevailed in this state a week ago have not been materially changed—the car supply has not improved, although there is just as great a demand for coal and prices are getting stronger. Shipments East are handled without trouble and instances have been cited where the same car has been loaded at the same mine twice within the same week, but shipments to the West have not been so satisfactory. The question of motive power which for a while interfered greatly with the handling of cars has been relieved.

Opinions among operators differ as to whether many men will go out on Apr. 1. Some believe there will be a considerable number while others only look for a strike in several places where the miners' organization has any material strength.

Predictions are freely made that if the anthracite miners go out, bituminous coal will reach $5 a ton by Apr. 10, or practically three times the prices prevailing at this time.

Louisville, Ky.

The outcome of the controversy between the operators of Pennsylvania, Ohio, Indiana and Illinois, on the one hand, and the miners on the other, over wage scales, is being watched with keen interest by the operators in Kentucky. The miners of the western Kentucky fields are affiliated with the United Mine Workers of America, with headquarters in Indianapolis. The Kentucky miners, however, are left to their own resources unless they appeal to the union, or are called upon by the latter to strike. As a result, the operators in Kentucky will not be certain just where they stand until the contest between the miners and operators in the tri-state agreement is decided.

Louisville has a supply of soft coal, including Pittsburg, sufficient to last six months, but if this is drawn upon by other cities as a result of the general shortage, the local supply would be converted into a shortage in a comparatively short space of time. Representatives of coal companies from Chicago and other points have been here recently seeking to purchase coal in the event of a general suspension of work among both the hard- and the soft-coal fields. If this shortage materializes it will mean materially higher prices locally, especially if the stringency lasts very long.

Nashville, Tenn.

Up until Mar. 15, the west Kentucky coal fields were making heavy shipments, both into St. Louis and Chicago, the markets there being very bullish up to that time, but on Mar. 16 the bottom dropped out of the market in St. Louis. At the present time the Louisville & Nashville R.R. has something like 400 cars of coal on demurrage at that point and an embargo has been placed on many prominent firms shipping into St. Louis.

The demand for screenings is still very great, although the market is dead at the present on the other sizes. Everyone is waiting on the conference at Cleveland, and a number of large buyers have discounted the results ahead of time and prepared for a disagreement. Should a general suspension occur in the bituminous field, the nonunion mines on the L. & N. and the I. C. in west Kentucky will reap one of the richest harvests they have ever known and operators in this section are hoping that such will be the case.

Indianapolis

Indications show an impending crisis in the coal situation in this state. The unexpected cold weather occasioned a coal famine in a number of towns and cities. The wholesale dealers refuse to quote prices and retailers, in the market for coal, either do without or pay the high price asked by the operators.

It does not make much difference as to quality. The question of quality is becoming secondary as all coal looks alike to the would-be purchaser who needs it. The railroads continue to store in great quantities, the only exception being the Southeastern, the old Walsh Southern Indiana. It has made an agreement by which the operators have been favored by getting as much coal to the market as possible, in preference to filling orders for storage purposes. In return the operators in the Linton or Green County field have agreed to give the railroads the entire output of 30 mines the last day before the suspension, which will amount to nearly 300 cars.

Minneapolis—St. Paul

Wholesale men here spend most of their time turning down orders or discussing the strike situation. Very little fuel is to be had as practically all coal is sold at the docks and most Illinois mines are reported to be sold up to Apr. 1. Of the coal coming into Minneapolis from Illinois fields, it is reported that only one or two cars now *en route* are not sold.

Steam users in and around the Twin Cities are beginning to be worried as the strike time approaches and have been asking for quotations quite freely on any kind of coal regardless of grades or sizes. They are beginning to realize now that they have taken too optimistic a view of the situation and some of them are clamoring right and left for supplies. The bituminous supply at the head of the lakes is almost exhausted and dock men are not taking any new orders but are holding what they have to supply their regular customers.

A canvas of the retail yards here showed that very little anthracite was in stock. Only small 30- or 40-ton lots were found here and there of nut, stove and egg sizes. No dealers report having any cargo pea or buckwheat. One large retailer had enough foresight to order several cars of anthracite all-rail which he says is coming along nicely and will be here shortly. With the docks swept clean of hard coal and no prospects now of having orders filled, all-rail from the East, it is the general belief that prices will not decline on anthracite as is customary Apr. 1.

Chicago

There has been a stiffening all along the line in the Chicago coal market. Steam lump and mine-run range from $2 @ 2.22 f.o.b. the mines, screenings at from $2.10@2.32 and the same for domestic lump.

Producing companies which supply the most of the Chicago market have sold out their available supply for the remainder of this month. About the only coal in this market commanding attention is smokeless mine-run; this is now selling f.o.b. Chicago at $4.25@4.50, which is on the basis of $2.20@2.45 f.o.b. the mines. Most all of the Carterville operators are sold up, but some few companies have a little coal remaining.

Prevailing prices at Chicago are:

Sullivan County:	
Domestic lump	$3.00
Egg	3.00
Steam lump	3.00
Screenings	$3.00@3.10
Springfield:	
Domestic lump	$3.00
Steam lump	3.00
Mine-run	3.00
Screenings	3.00
Clinton:	
Domestic lump	$3.00
Steam lump	3.00
Mine-run	3.00
Screenings	$3.00@3.10
Pocahontas and New River:	
Mine-run	$4.25@4.50
Lump and egg	4.25@4.50

Prices asked for coke are: Connellsville and Wise County, $4.85; byproduct, egg and stove, $4.95; byproduct, nut, $4.75; gas house, $4.90@5.

St. Louis, Mo.

As prophesied in last week's report, the break in the market that has been expected for the past two or three weeks came the latter part of the past week. Everything in the way of local coals took a slump, and the beginning of the present week finds the market in a demoralized condition. Railroad orders are about cleaned up, and this has thrown considerable free coal on the market, for which there is no demand.

The chances are from now on, unless something unexpected turns up, the market will continue weak. One of the causes of the St. Louis market breaking was the buying of between 800 and 900 cars of Kentucky coal by St. Louis jobbers, who were anticipating a rise in the market. The close of last week found close to 500 cars of Kentucky coal under demurrage at East St. Louis, and several hundred more in transit. It was simply impossible to move this coal at any figure, and everything indicates that a portion of it will remain on track for a week possibly before it is cleaned up. Buyers who had not stocked, bought Kentucky coal at their own figures, and this demoralized the Illinois market.

The market opened the early part of the week about as follows:

Franklin County	
Lump and egg	$1.90@2.00
No. 1 nut	1.90@2.00
No. 2 nut	1.75@1.87
No. 3 nut	1.75@1.80
2-in. screenings	1.60@1.70
Carterville	
Lump and egg	$1.85@2.00
No. 1 nut	1.85@1.95
No. 2 nut	1.75@1.85
No. 3 nut	1.70@1.75
Screenings	1.60@1.70
Mine-run	1.55@1.65
No. 1 washed	2.00@2.10
No. 2 washed	1.90@2.00
No. 3 washed	1.85@1.95
No. 4 washed	1.75@1.85
No. 5 washed	1.60@1.70
Standard	
6-in. lump	$1.70@1.80
2-in. lump	1.60@1.70
Screenings	1.55@1.65
Mt. Olive	
6-in. lump	$1.85
3-in. lump	1.75

San Francisco, Calif.

In the past week heavy rain has fallen throughout California; this, coupled with a cold, chilly wind, has materially increased the consumption of coal. A continuance of these conditions should reduce stocks considerably, affording the dealers an opportunity to get their yards in good shape prior to the slack summer months' trade.

Current prices to the trade are as follows, per long ton:

Wellington, B. C.	$8.00
Pelane Main (Australia)	8.00
American canal	8.15
Rock Springs	9.00
Cumberland	12.50
Peacock (Rock Springs)	7.90

Portland, Ore.

The British ship "Kircudbrightshire" arrived in the Columbia River this week with a cargo of coal from Australia. This will be the last cargo to come here this season from Australia, and coal dealers are glad of it because the overhold stock is quite sufficient as it is.

The market here is inactive and from now on till fall the demand is not expected to come from the regular sources. Oregon and Washington are enjoying ideal spring weather but snow fell in some parts of Idaho during the week. It is expected that storage prices will be announced early this year, owing to the large carry-over stock.

Production and Transportation Statistics

Norfolk & Western Ry.

The following is a comparative statement of coal and coke shipments over the lines of the N. & W. Ry. for the first two months of the years 1911-12, in short tons:

Destination	1912	1911
Coal		
Tidewater, foreign	219,893	175,851
Tidewater, coastwise	535,943	398,518
Domestic	2,716,413	2,219,078
Coke		
Tidewater, foreign	8,544	20,466
Domestic	261,020	294,103
TOTALS	3,741,813	3,108,021

Chesapeake & Ohio Ry.

The following is a statement of coal and coke traffic over the lines of the C. & O. Ry. for January and 7 months ending January, 1912, in short tons:

C. & O. Ry. Shipments

COAL

Destination	January	7 Months
Tidewater	335,290	2,305,754
East	212,314	1,281,733
West	750,103	6,485,874
Total	1,297,707	10,073,361
Bituminous from connections	18,914	136,240
Anthracite from connections	3,155	21,904
Grand total	1,319,776	10,231,505

COKE

Tidewater	58	1,338
East	8,540	66,494
West	7,605	50,228
Total	16,203	118,060
From connections	1,237	9,997
Grand total	17,440	128,037

The Car Situation

Statement of idle cars as reported to the American Railway Association as of Mar. 13, shows that the peculiar conditions which have been reflected in recent weeks still prevail. The net surplus on the last date reported was but 3033. Two weeks ago the surplus was 7842. The gross surplus of idle cars is 46,02[illegible], but shortages totaling 42,985 made the net surplus the smallest in years. This condition resulted from an unequal distribution of the empty cars. In the two weeks ended Mar. 13 the surplus of coal cars decreased from 10,239 to 9844, and the box-car surplus increased from 902[illegible] to 12,910. Shortages in these classes of cars, however, increased decidedly.

Foreign Markets

Prussia

The total production of coal in Prussia for the year 1911 was 13,721,845 tons, as compared with 12,731,097 for 1910. Production of other fuels in 1911 was: Lignite, 5,609,731 tons; coke, 2,326,966; coal briquettes, 419,028; lignite briquettes, 1,265,335. The total production of these latter in 1910 was: Lignite, 5,195,384; coke, 2,219,226; coal briquettes, 401,514; lignite briquettes, 1,170,529 tons.

German Empire

Fuel production in the German Empire for 1911 was: Coal, 14,565,606; lignite, 6,865,208; coke, 2,340,366; coal briquettes, 424,961; lignite briquettes, 1,497,060. The production of these same fuels in 1910 was: Coal, 13,527,215; lignite, 6,319,544; coke, 2,231,865; coal briquettes, 405,625; lignite briquettes, 1,383,503.

Financial Notes

Westmoreland Coal Co. declared the semi-annual dividend of 3 per cent. and an extra dividend of ½ of 1 per cent., payable Apr. 1 to stock of record Mar. 19.

The American Coal Products Co. has declared the regular quarterly dividend of 1¾ per cent. on its common and preferred stocks. The former is payable Apr. 1 to holders of record Mar. 25, and the latter on Apr. 15 to holders of record Apr. 10.

Notwithstanding the fact that the New England Coal & Coke Co. delivered 14 per cent. more coal in January of this year than in January, 1911, and 4 per cent. more in February this year than in the same month in 1911, the net profits for the two months are substantially less.

Annual report of the Consolidation Coal Co. for the year ended Dec. 31, 1911, shows gross earnings of $11,420,694, as compared with $12,712,256 for the year 1910. Net earnings after deducting depreciation were $2,652,414, as compared with $3,215,226 for the year 1910. Dividends for the year 1911 were $1,201,513, and the balance surplus was $182,322, as compared with $1,141,522 and $571,024 respectively, for the year 1910.

A syndicate composed of the National City Bank, Lee, Higginson & Co. and Kissel, Kinnicut & Co., has bought from the Tidewater Co., which controls the Virginian Ry. in the interest of the H. H. Rogers estate, $25,000,000 of first mortgage 5 per cent. 50-year gold bonds of the Virginian company. The principal purpose of the sale is the payment of $17,000,000 of Tidewater Co. 6 per cent. notes which have been called for redemption on June 1. Another $1,000,000 of the proceeds will be used for improvements.